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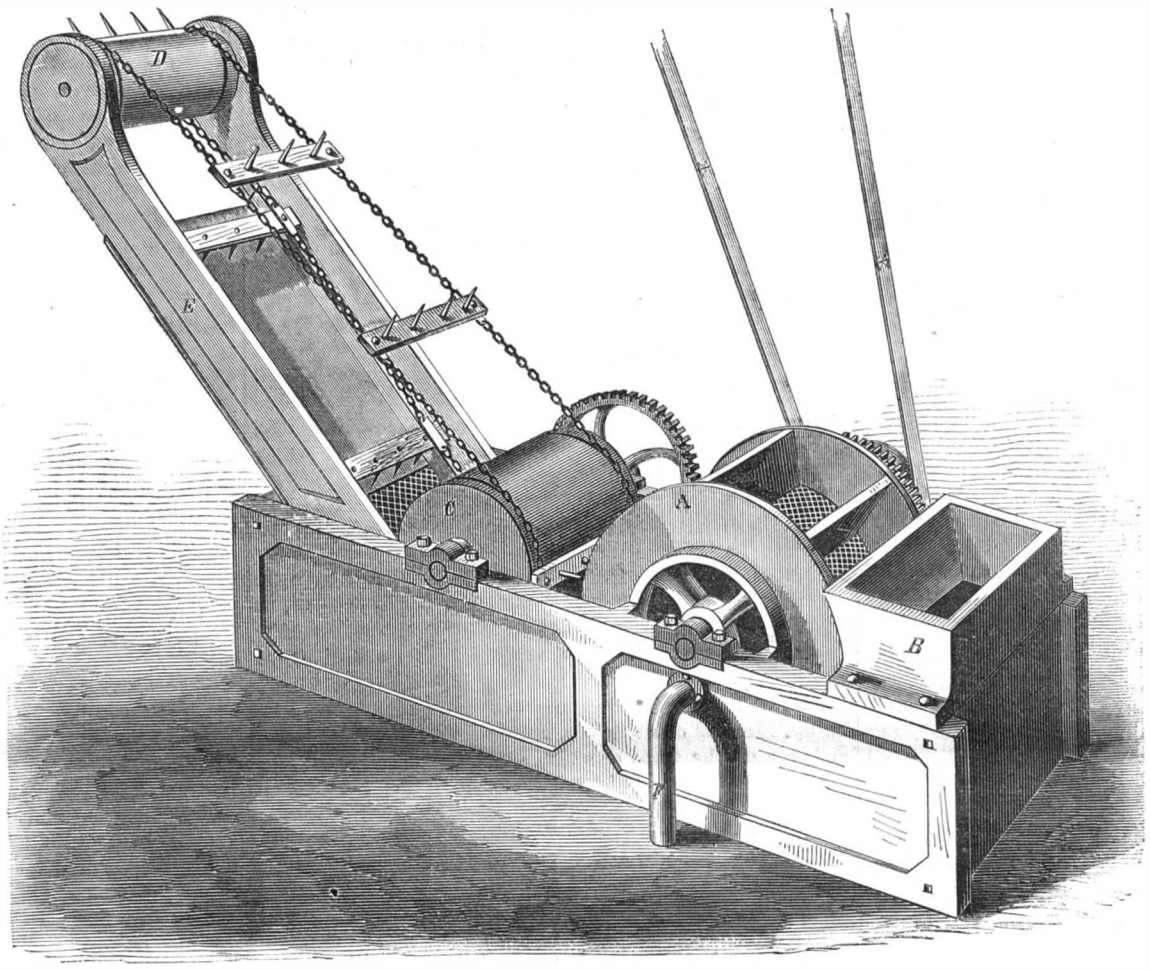
Improved Machine for Washing Paper Stock.

The object of the invention which is illustrated in the accompanying engraving is to furnish an improved washer for cleansing paper stock, so that after being washed the foul water shall not again come in contact with the stock, but be discharged.

The engraving represents an ordinary tank furnished with an agitating wheel, A, provided with floats, beneath which is a gauze wire cylinder forming a portion of the wheel. This wheel is driven by any power, a belt and pulley being shown in the engraving. In front of the wheel is a hopper, B, into which the rags or other description of stock, or the pulp is fed, the stock being delivered to the lower surface of the wheel, which is immersed in water about one third of its diameter. In the rear of the bucket wheel is a cylinder, C, connected with another, D, at the top of the fixed incline, E, by means of two chains, carrying a series of toothed bars or rakes for lifting the washed stock and delivering it at any required hight, or in an upper story of the building. The lower cylinder is connected to and driven by the agitating wheel by means of gearing adjusted to run the elevator at the proper speed. To cause the wet stock to be readily discharged from the rake teeth, the ways or guides on which the ends of the rake bars slide are so arranged that the rakes are forced inward from a straight line, so that when they pass beyond the upper ends of the ways they spring outward, or downward, with force sufficient to discharge the stock. The screen at the foot of the inclined chute is designed to separate kernels, gravel, or any foreign matter from the stock. If pulp is washed the rakes may be provided with screens of wire netting to retain it while it is being delivered.



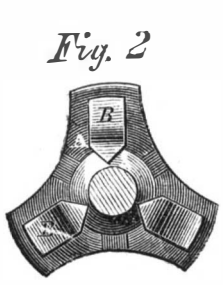
ANDREWS' PAPER STOCK WASHING MACHINE.

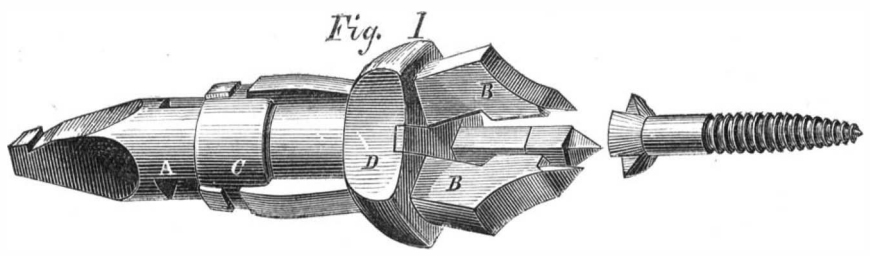
One end of the agitating wheel is provided with a projecting hub or flange, of a diameter not exceeding that of the gauze cylinder forming the body of the wheel. The edge of this hub fits closely to a semicircular projection on the inside of the tank, and the two form a passage with the pipe, F, for discharging the foul water from the interior of gauze cylinder while preventing the wasting of any of the stock or pulp. The design, construction, operation, and advantages of the machine can be understood by the foregoing description and illustration.

Patented through the Scientific American Patent Agency, July 14, 1868, by J. E. Andrews, whom address for additional particulars, at Coeyman's Hollow, Albany Co., N. Y.

Improved Wood Screw and Driver.

The slotted head of the common wood screw is frequently split when much force is required to seat it or to remove it, and every mechanic has been annoyed by the slipping off of the screw driver blade from the head of the screw. To provide a remedy for these objections is the object of the inventor of the screw and driver shown in the accompanying engravings. The screw head has three V-shaped notches cut equidistant in the edge, instead of the single cross slot. The screw driver, seen in perspective in Fig 1, has three corresponding jaws which by a simple arrangement automatically open and close upon the screw head.





JACOBUS' PATENT WOOD SCREW AND SCREW DRIVER.

The stock, A, is intended to fit into a bit-stock, and is hollow for the larger part of its length, and has three longitudinal slots in which slide the jaws, B, all moved simultaneously by a sliding ring, C, with which they engage. They are opened and closed by means of the incline of their forward portion sliding through corresponding apertures in the collar end of the implement, designated by D in Fig. 1.

When held in an upright position, the jaws down, the combined weight of jaws, and ring cause them to fall, and the points of the jaws open sufficiently to receive the head of an ordinary screw. Now if pressure is exerted the stock is forced down and the jaws compressed, griping the screw-head with an energy proportioned to the forced exerted; the harder the pressure the greater the tenacity of the grip. The edges of the jaw points, when they are seated on the screw head, project sufficiently to cut a countersink to seat the head, preventing the necessity of using a separate tool for this purpose. In fact, unless in very hard wood, there will be no necessity of previously boring a hole to receive the screw. When the screw is nearly home the driver may be raised and the head driven to its seat. In removing a screw this driver is equally effective. One advantage of this device may not be apparent at first sight; that is the absolute connection between the screw and driver which will enable the workman to drive the screw into wood at any angle, perfectly governing its direction. The increased strength of the screw head from this style of construction, the certainty of grip on the screw, and the entire control over the course of the screw appear to us to highly recommend this device.

Improved form of screw patented Aug. 4, 1868, and driver, 18th of the same month, same year, both through Scientific American Patent Agency. Address P. N. Jacobus, M D., Flatbrookville, N. J. See "Business and Personal" in this issue.

Manner of Using Steel in the St. Louis Bridge.

In the report of the Engineer-in-chief, Mr. James B. Eads, the method of using steel in bridge construction is thus referred to:

"To obtain the highest value of cast steel in compression, with the greatest economy in construction, I think it should be used in the tubular form. Although cast-steel tubes have been recently drawn cold by hydrostatic pressure in France, from steel expressly prepared for the purpose, I cannot learn that the process has been carried to any extent beyond the production of gun barrels. It is quite possible that this method may in the future furnish steel much superior for bridging to anything we can now obtain. I have but little doubt that methods of manufacturing and tempering steel in this form, for bridge construction, will soon be discovered, by which a much higher value of strength may be safely used in construction. As the use of cast steel in bridge building is comparatively in its infancy, I have deemed it proper to use the material at a much safer limit as regards its ultimate strength than my judgment would otherwise dictate. I feel assured that the structure would be entirely safe to bear a far greater load than can be placed upon it, if its arches contained but one half of the steel that will form them. When this material comes to be universally used in bridge construction in the place of wrought and cast iron, as it inevitably will be, because of its greater economy, the very large margin for safety provided by the liberal use of this material in your bridge will be more fully appreciated.

"To insure a uniform quality and high grade of steel at the lowest prices, and at the same time avail myself of the advantages of the tubular form of construction, I propose to have the steel rolled for the arches in bars of 9 feet length and of such form than 10 of them shall fill the circumference of a 9-inch lap-welded tube about ¼-inch thick, in the manner that the staves of a barrel fill the hoops. This would virtually from a steel tube 9 inches in diameter and of 6 inches bore, the steel being about 1½ inches thick, and would be much less expensive than if the tube were rolled or drawn in one piece. The manufacture of steel in such small bars will insure a more uniform quality in the metal, and in the tube each bar will be supported against deflection in every direction.

"The tubes will be retained in their positions by an effective system of bracing, which will sustain the *voussoirs*, or pieces against which the tubes are butted throughout the arch. The upper and lower members of each arch will each be formed of two courses of these tubes, from end to end of the arch, each tube having a sectional area of 36 square inches at the summit of the arch. As each span would be made up of four arches, and each arch of four of these tubes, the span would have an aggregate sectional area at that part of 576 cubic inches of steel. The tubes, for about 20 feet of their lengths nearest the abutments, would require one-half more sectional area to resist the greater strains at those points. The tubing in which the steel bars would be inclosed would effectually protect the latter from the weather. I am gratified in being able to state that proposals from several of our leading steel makers in the United States have been received, and also from the most celebrated in Europe, among whom I may name Vickers & Co., of England; Petin Gaudet & Co., of France; and Fried. Krupp, of Prussia; all offering to furnish the steel and agreeing to guarantee its strength fully up to the standard required. The importance of being guided by the very best lights that can be obtained from practical and careful experiment, and the great interests involved in the safety and permanency of the structure, fully convinced me, at the inception of this enterprise, of the necessity of instituting a careful series of experimental tests of the materials to be used, and also determined me to have every part of the structure thoroughly tested to a degree of strain much beyond what it can by any possibility be subjected to when in the bridge. For this purpose I am having a powerful machine made, that will be capable of carefully testing every member used in its construction."

Tools rust out from neglect; wear out from use. Neglect is criminal; use is beneficial. So with man's capabilities; better wear out than rust out.

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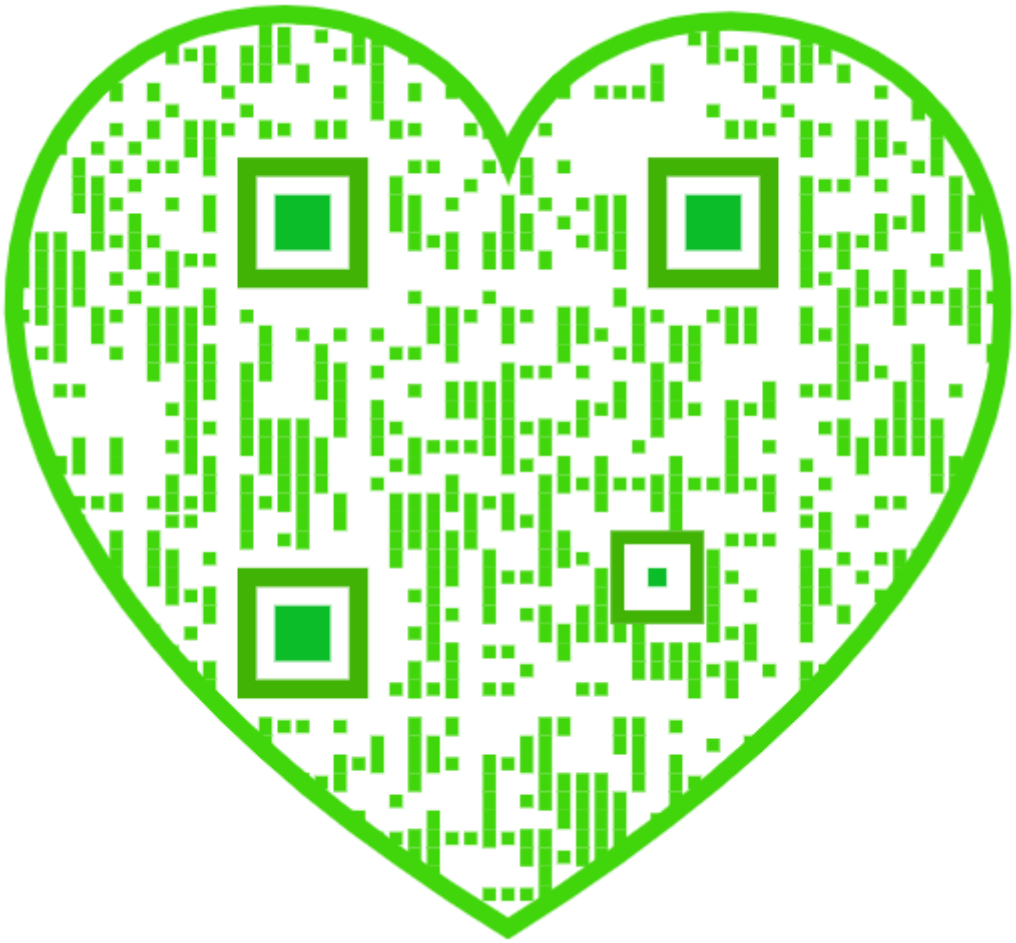

HOW NEWSPAPERS ARE MADE.

In our last issue we published from the *Evening Mail* some interesting details concerning the machinery employed in the production of newspapers. We continue the subject from the same journal. The last article left the types on the "galleys."

Our matter has been set up, justified, proved, and revised, so that we are now ready to make it up in columns. Ordinary job work is set up on a flat bed, inclosed in an iron frame called a "chase," and locked up by means of wooden wedges, but all newspapers of considerable circulation use the type-revolving press, and the matter is made up, therefore, entirely on "turtles."

"MAKING UP."

These are very heavy, and each, therefore, has a wooden stand of his own, about waist high, which may easily be rolled from place to place. The column rules—that is, the lines between the columns of the paper—are each all in one piece and permanently attached to the turtle, so that type can easily be slid up and down the column. Daily papers require one workman to keep the run of the advertisements alone, and insert or omit them on the proper days according to the arrangements of the publication office. The advertisements, then, are placed in their proper columns in the turtles—the matter being transferred in small portions—then the general matter, room being reserved for the late matter and dispatches. These set up and proved, in they go; a foreman locks up the type with a wrench, which drives screws that compress the columns from the bottom, the type is hammered, to make it even, with a block and mallet, and the forms are ready. Each page requires one turtle. They are awkward looking, curved arrangements, with projections on the bottom by which they are fastened on to the press cylinder, and weigh, when filled with type, nearly a quarter of a tun.

THE PRESS-ROOM.

Nearly all the dailies have their press-rooms in their basements and their compositors in the attic, so that the turtle is whizzed down the "dumb-waiter"—as our housekeeping friends would say—into the nether regions at a great rate. Here it is received on another stand and rolled to the press, over which is a sliding beam with hoisting apparatus to get the turtle upon the press. This requires the strength of two or three men, who hoist it, slide it along, and lower it carefully upon the cylinder, which has been stopped just so as to receive the turtle at the top. The creak of the hoisting calls the pressmen to their machine, one man to feed each paper cylinder—from two to ten in number—and several to stack the papers thrown off by the flyers of the press.

"STARTING UP."

The turtles fastened on, the nearest pressman turns the lever and off goes the press, piling up the papers at the rate of a couple of thousand copies an hour for each cylinder. The *Mail* press is a four-cylinder and rattles off its eight thousand an hour at a great rate. The *World* has a ten-cylinder press, the largest size made. In these a labyrinth of stairways are required to reach the various parts, and the room must be at least twenty feet high. Two eight-cylinders supply the readers of the *Tribune*. The *Herald* has five Hoe presses.

THE NEWSBOYS.

One of the important adjuncts and chief botherations of an evening paper are the newsboys—including girls—who congregate in the part of the press-room allotted to them, and do their best to overflow to where they may get at the press and the machinery. They sell morning papers from six to ten, Grecian Bends during the middle of the day, evening papers in the afternoon, and, as a general thing, go to the New Bowery in the evening. *Ad interim*, they lay off on the press-room steps, tell stories, and fight, the girls being, as a general thing, better than the boys at the latter.

A PRESS CURIOSITY.

One of the curiosities of Printing House Square is the huge engine which runs the *Mail* press, as well as many others. This is owned by a firm in Spruce street between William and Nassau, and occupies the basement of their building There is a large 150 horse-power engine which runs during the day, and a 75 horse-power which relieves it at night. From this shafting and belting distribute the power in every direction. One shaft runs to and across Frankfort street, supplying the *Mail* and other offices, another crosses William street and runs the six cylinder presses which pile the 300,000 copies of the *Ledger* in its beautiful press room. Another shaft crosses Spruce street, runs through and across Beekman, and even supplies presses in Ann street.

ITS SHAFTS AND BELTING.

Altogether these engines supply over 125 presses—each being estimated and charged so much per horse-power according to this estimate. It runs three-quarters of a mile of main shafting, beside a mile or more connecting shafts and as much belting. One of these belts, an india-rubber one, 120 feet long, connects a fifth story press on Nassau street with the main shafting on Spruce across the intervening yards, and another leather one on Beekman street street, 140 feet long, perfectly perpendicular, connects the sub-cellar and attic.

WHAT IT DOES.

This engine prints all McLaughlin's toy books, runs the immense establishments of Bradstreet and J. W. Oliver, beside many other job printers, and a hoop-skirt manufactory and several binderies, and prints nearly fifty papers, beside magazines and books innumerable, among them, beside the *Mail*, the *Independent, Dispatch, Leader, Star, Examiner and Chronicle, Observer, Courier, Clipper, Wilkes' Spirit, Turf, Field, and Farm, Police Gazette, La Crosse Democrat, Ledger, New York Weekly, Literary Album, Sunday Times, New Yorker Democrat, Commonwealth, Scottish American, Freeman's Journal, Tablet, Emerald, Irish American, Irish People*, etc., etc. Truly a power in the world.

FOLDING THE PAPERS.

Most of the quarto dailies have folding machines in their press-rooms, which fold a pile of papers with incredible rapidity. The weeklies are mostly folded by hand, the workmen attaining a wonderful expertness. Nearly a dozen men are occupied, however, with all their quickness, in folding and mailing the weekly issue of the *Independent*.

ABOUT PAPER.

One of the most important items in the cost of a paper is the paper itself. Some of the statistics of the *Tribune*, the largest sized paper published, will show its extent. Its paper weighs 65 pounds per ream (240 sheets), and measures 37 by 47¾ inches. One issue of the 240,000 copies of the *Weekly Tribune* weighs 31,200 pounds, over fifteen tuns. This makes a column three feet by two at the base, and one hundred and forty feet high. The paper used by the *Tribune* establishment during the year is about fifteen hundred tuns, costing over $300,000, which, if piled, would make a monument of solid intelligence one mile high and four feet square. Something like twenty-five million sheets pass their presses every year.

MAILING PAPERS.

Another considerable item is directing papers to mail subscribers. It is calculated that to write the directions of one issue of the *Weekly Tribune*, sixty-seven persons would be employed a whole day. Most papers, therefore, adopt the system of keeping the names of subscribers on printed lists, which are cut apart and pasted on the papers. These are then made up in bundles for each postoffice, and thus started off. It takes several cars to carry the weekly editions of our morning papers which are sent to the West.

Such, reader, are the immense agencies at work in a merely mechanical way in producing for you your daily paper, which costs you five, four, or "only two cents."

THE EARTH A MAGNET.

The Cornhill Magazine contains an article with the above title which, contains in a popular form, the facts and theories in regard to terrestrial magnetism, a condensation of which will be of interest to our readers.

"The peculiarity that the magnetic needle does not, in general, point to the north, is the first of a series of peculiarities which we now propose briefly to describe. The irregularity is called by sailors the needle's variation, but the term more commonly used by scientific men is the declination of the needle. It was probably discovered a long time ago, for 800 years before our era the Chinese applied the magnet's directive force to guide them in journeying over the great Asiatic plains; and they must soon have detected so marked a peculiarity. Instead of a ship's compass they made use of a magnetic car, on the front of which a floating needle carried a small figure whose outstretched arm pointed southward. We have no record, however, of their discovery of the declination, and know only that they were acquainted with it in the twelfth century. The declination was discovered, independently, by European observers in the thirteenth century.

"As we travel from place to place the declination of the needle is found to vary; Christopher Columbus was the first to detect this. He discovered it on the 13th of September, 1492, during his first voyage, and when he was six hundred miles from Ferro, the most westerly of the Canary Islands. He found that the declination, which was toward the east in Europe, passed to the west, and increased continually as he traveled westward.

"But here we see the first trace of a yet more singular peculiarity. We have said that at present the declination is toward the west in Europe. In Columbus' time it was toward the east. Thus we learn that the declination varies with the progress of time, as well as with change of place.

"We find first, that the world may be divided into two unequal portions, over one of which the needle has a westerly, and over the other an easterly, declination. Along the boundery line, of course, the needle points due north. England is situated in the region of westerly magnets. This region includes all Europe, except the north-eastern parts of Russia; Turkey, Arabia, and the whole of Africa; the greater part of the Indian Ocean, and the western parts of Australia; nearly the whole of the Atlantic Ocean; Greenland, the eastern parts of Canada, and a small slice, from the north-eastern part of Brazil. All these form one region of westerly declination; but singularly enough, there lies in the very heart of the remaining and larger region of easterly magnets, an oval space of a contrary character. This space includes the Japanese Islands, Manchouria, and the eastern parts of China. It is very noteworthy also, that in the westerly region the declination is much greater than the easterly. Over the whole of Asia, for instance, the needle points almost due north. On the contrary, in the north of Greenland and of Baffin's Bay, the magnetic needle points due west, while still further to the north (a little westerly) we find the needle pointing with its north end directly toward the south.

"In the fifteenth century there was an easterly declination. This gradually diminished, so that in about the year 1657 the needle pointed due north. After this the needle pointed toward the west, and continually more and more, so that scientific men, having had experience only of a continual shifting of the needle in one direction, began to form the opinion that this change would continue, so that the needle would pass, through north-west and west, to the south. In fact, it was imagined that the motion of the needle would resemble that of the hands of a watch, only in a reversed direction. But before long observant men detected a gradual diminution in the needle's westerly motion. Arago, the distinguished French astronomer and physicist, was the first (we believe) to point out that 'the progressive movement of the magnetic needle toward the west appeared to have become continually slower of late years' (he wrote in 1814), 'which seemed to indicate that after some little time longer it might become retrograde.' Three years later, namely on the 10th of February, 1817, Arago asserted definitively that the retrograde movement of the magnetic needle had commenced to be perceptible. It appears from a careful comparison of Beaufoy's observations that the needle reached the limit of its western digression (at Greenwich) in March, 1819, at which time the declination was very nearly 25°. In Paris, on the contrary, the needle had reached its greatest western digression (about 22½°) in 1814. It is rather singular that although at Paris the retrograde motion thus presented itself five years earlier than in London, the needle pointed due north at Paris six years later than in London, viz. in 1663. Perhaps the greater amplitude of the needle's London digression may explain this peculiarity.

"'It was already sufficiently difficult,' says Arago, 'to imagine what could be the kind of change in the constitution of the globe, which could act during one hundred and fifty-three years, in gradually transferring the direction of the magnetic needle from due north to 23° west of north. We see that it is now necessary to explain, moreover, how it has happened that this gradual change has ceased, and has given place to a return toward the preceding state of the globe.' 'How is it,' he pertinently asks, that the directive action of molecules of which the globe is composed, can be thus variable, while the number, position, and temperature of these molecules, and, as far as we knew, all their other physical properties remain constant?'

"But we have considered only a single region of the earth's surface. Arago's opinion will seem still more just when we examine the change which has taken place in what we may term the the "magnetic aspect" of the whole globe. The line which separates the region of westerly magnets from the region of easterly magnets, now runs, as we have said, across Canada and eastern Brazil in one hemisphere, and across Russia, Asiatic Turkey, the Indian Ocean, and West Australia in the other; beside having an outlying oval to the east of the Asiatic Continent. Now these lines have swept around a part of the globe's circuit in a most singular manner since 1600. They have varied alike in direction and complexity. The Siberian oval, now distinct, was, in 1787, merely a loop of the eastern line of no declination. The oval appears now to be continually diminishing, and will one day probably disappear.

"We find here presented to us a phenomenon as mysterious, as astonishing, and as worthy of careful study as any embraced in the wide domains of science. But other peculiarities await our notice. If a magnetic needle of suitable length be carefully poised on a fine point, or, better, be suspended from a silk thread without torsion, it will be found to exhibit each day two small but clearly perceptible oscillations. M. Arago, from a careful series of observations, deduced the following results:

"At about eleven at night, the north end of the needle begins to move from west to east, and having reached its greatest easterly excursion at about a quarter past eight in the morning, returns toward the west to attain its greatest westerly excursion at a quarter past one. It then moves again to the east, and having reached its greatest easterly excursion at half past eight in the evening, returns to the west, and attains its greatest westerly excursion at eleven, as at starting.

"Of course, these excursions take place on either side of the mean position of the needle, and as the excursions are small never exceeding the fifth part of a degree, while the mean position of the needle lies some 20° to the west of north, it is clear that the excursions are only nominally eastern and western, the needle pointing throughout, far to the west.

"Now if we remember that the north end of the needle is that furthest from the sun. it will be easy to trace in M. Arago's results a sort of effort on the part of the needle to turn toward the sun—not merely when that luminary is above the horizon, but during his nocturnal path also. We are prepared, therefore, to expect that a variation having an annual period shall appear, on a close observation of our suspended needle. Such a variation has been long since recognized. It is found that in the summer of both hemispheres, the daily variation is exaggerated, while in winter it is diminished.

"But beside the divergence of a magnetized needle from the north pole, there is a divergence from the horizontal position, which must now claim our attention. If a non-magnetic needle be carefully suspended so as to rest horizontally, and be then magnetized, it will be found no longer to preserve that position. The northern end dips very sensibly. This happens in our hemisphere. In the southern it is the southern end which dips. It is clear, therefore, that if we travel from one hemisphere to the other we must find the northern dip of the needle gradually diminishing until at some point near the equator the needle is horizontal, and as we pass thence to southern regions a gradually increasing southern inclination is presented. This has been found to be the case, and the position of the line along which there is no inclination (called the magnetic equator) has been traced around the globe. It is not coincident with the earth's equator, but crosses that circle at an angle of twelve degrees, passing from north to south of the equator in long. 3° west of Greenwich, and from south to north in long. 187° east of Greenwich. The form of the line is not exactly that of a great circle, but presents here and there (and especially where it crosses the Atlantic) perceptible excursions from such a figure.

"At two points on the earth's globe the needle will rest in a

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vertical position. These are the magnetic poles of the earth. The northern magnetic pole was reached by Sir J G. Ross, and lies in 70° N. lat. and 263° E. long., that is, to the north of the American continent, and not very far from Bootbia Gulf. One of the objects with which Ross set out on his celebrated expedition to the Antarctic Seas was the discovery if possible of the southern magnetic pole. In this he was not successful. Twice he was in hopes of attaining his object, but each time he was stopped by a barrier of land. He approached so near, however, to the pole, that the needle was inclined at an angle of nearly ninety degrees to the horizon, and he was able to assign to the southern pole a position in 75° S. lat., 154° E long. It is not probable, we should imagine, that either pole is fixed, since we shall now see that the inclination, like the declination of the magnetic needle, is variable from time to time, as well as from place to place; and, in particular, the magnetic equator is apparently subjected to a slow but uniform process of change.

"Arago tells us that the inclination of the needle at Paris has been observed to diminish year by year since 1671. At that time the inclination was no less than 75°; in other words, the needle was inclined only 15° to the vertical. In 1791 the inclination was less than 71°. In 1831 it was less than 68°. In like manner the inclination at London has been observed to diminish, from 72° in 1786 to 70° in 1804, and thence to 68° at the present time.

"It might be anticipated from such changes as these, that the position of the magnetic equator would be found to be changing. Nay, we can even guess in which way it must be changing. For, since the inclination is diminishing at London and Paris, the magnetic equator must be approaching these places, and this (in the present position of the curve) can only happen by a gradual shifting of the magnetic equator from east to west along the true equator. This motion has been found to be really taking place. It is supposed that the movement is accompanied by a change of form; but more observations are necessary to establish this interesting point.

"Can it be doubted that while these changes are taking place, the magnetic poles are slowly shifting round the true pole? Must not the northern pole, for instance, be further from Paris now that the needle is inclined more than 23° from the vertical than in 1671, when the inclination was only 15°. It appears obvious that this must be so, and we deduce the interesting conclusion that each of the magnetic poles is rotating around the earth's axis.

"But there is another peculiarity about the needle which is as noteworthy as any of those we have spoken about. We refer to the intensity of the magnetic action, the energy with which the needle seeks its position of rest. This is not only variable from place to place, but from time to time, and is further subject to sudden changes of a very singular character.

"It might be expected that where the dip is greater, the directive energy of the magnet would be proportionably great. And this is found to be approximately the case. Accordingly the magnetic equator is very nearly coincident with the 'equator of least intensity,' but not exactly. As we approach the magnetic poles we find a more considerable divergence, so that instead of there being a northern pole of greatest intensity nearly coincident with the northern magnetic pole, which we have seen lies to the north of the American continent, there are *two* northern poles—one in Siberia nearly at the point where the river Lena crosses the Arctic circle, the other not so far to the north—only a few degrees north, in fact, of Lake Superior. In the south, in like manner, there are also two poles—one on the Antartic circle, about 130° E. long., in Adelie Island, the other not yet precisely determined, but supposed to lie on about the 240th degree of longitude, and south of the Antartic circle. Singularly enough there is a line of lower intensity running right round the earth along the valleys of the two great oceans, 'passing through Behring's Straits, and bisecting the Pacific on one side of the globe, and passing out of the Arctic Sea by Spitzbergen and down the Atlantic on the other.'

"Colonel Sabine discovered that the intensity of the magnetic action varies during the course of the year. It is greatest in December and January *in both hemispheres* If the intensity had been greatest in winter one would have been disposed to have assigned seasonal variation of temperature as the cause of the change. But as the epoch is the same for both hemispheres we must seek another cause. Is there any astronomical element which seems to correspond with the law discovered by Sabine? There is one very important element. The position of the perihelion of the earth's orbit is such that the earth is nearest to the sun on about the 31st of December or the 1st of January. There seems nothing rashly speculative, then, in concluding that the sun exercises a magnetic influence on the earth, varying according to the distance from the sun. Nay, Sabine's results seem to point very distinctly to the law of variation. For, although the number of observations is not as yet very great, and the extreme delicacy of the variation renders the determination of its amount very difficult, enough has been done to show that in all probability the sun's influence varies according to the same law as gravity—that is, inversely as the square of the distance

"That the sun, the source of light and heat, and the great gravitating centre of the solar system, should exercise a magnetic influence upon the earth, and that this influence should vary according to the same law as gravity, or as the distribution of light and heat, will not appear perhaps very surprising. But the discovery by Sabine that *the moon* exercises a distinctly traceable effect upon the magnetic needle seems to us a very remarkable one. We receive very little light from the moon, much less (in comparison with the sun's light) than most persons would suppose, and we get absolutely no perceptible heat from her. Therefore it would seem rather to the influence of mass and proximity that the magnetic disturbances caused by the moon must be ascribed. But if the moon exercises an influence in this why, why should not the planets? We shall see that there is evidence of some such influence being exerted by these bodies.

"More mysterious if possible than any of the facts we have discussed is the phenomenon of *magnetic storms.* The needle has been exhibiting for several weeks the most perfect uniformity of oscillation. Day after day the careful microscopic observation of the needle's progress has revealed a steady swaying to and fro, such as may be seen in the masts of a stately ship at anchor on the scarce-heaving breast of ocean. Suddenly a change is noted; irregular jerking movements are perceptible, totally distinct from the regular periodic oscillations. A magnetic storm is in progress. But where is the centre of disturbance, and what are the limits of the storm? The answer is remarkable. If the jerking movements observed in places spread over very large regions of the earth—and in some well-authenticated cases over the whole earth—be compared with the local time, it is found that (allowance being made for difference of longitude) *they occur precisely at the same instant.* The magnetic vibrations thrill in one moment through the whole frame of our earth.

But a very singular circumstance is observed to characterize these magnetic storms. They are nearly always observed to be accompanied by the exhibition of the aurora in high latitudes, northern and southern. Probably they never happen without such a display; but numbers of auroras escape our notice. The converse proposition, however, *has* been established as universal one. No great display of the aurora ever occurs without a strongly marked magnetic storm.

"Magnetic storms sometimes last for several hours or even days.

"Remembering the influence which the sun has been found to exercise upon the magnetic needle, the question will naturally arise, has the sun anything to do with magnetic storms? We have clear evidence that he has.

"On the 1st of September, 1859, Messrs. Carrington and Hodgson were observing the sun, one at Oxford and the other in London. Their scrutiny was directed to certain large spots which, at that time, marked the sun's face. Suddenly, a bright light was seen by each observer to break out on the sun's surface, and to travel, slowly in appearance, but in reality at the rate of about 7,000 miles in a minute, across a part of the solar disk. Now it was found afterward that the self-registering magnetic instruments at Kew had made at that very instant a strongly marked jerk. It was learned that at that moment a magnetic storm prevailed at the West Indies, in South America, and in Australia. The signalmen in the telegraph stations at Washington and Philadelphia received strong electric shocks; the pen of Bain's telegraph was followed by a flame of fire; and in Norway the telegraphic machinery was set on fire. At night great auroras were seen in both hemispheres. It is impossible not to connect these startling magnetic indications with the remarkable appearance observed upon the sun's disk.

"But there is other evidence. Magnetic storms prevail more commonly in some years than in others. In those years in which they prevail most frequently, it is found that the ordinary oscillations of the magnetic needle are more extensive than usual. Now when these peculiarities had been noticed for many years, it was found that there was an alternate and systematic increase and diminution in the intensity of magnetic action, and that the period of the variation was about eleven years. But at the same time a diligent observer had been recording the appearance of the sun's face from day to day and from year to year. He had found that the solar spots are in some years more freely displayed than in others. And he had determined the period in which the spots are successively presented with maximum frequency to be about 11 years. On a comparison of the two sets of observations, it was found (and has now been placed beyond a doubt by many years of continued observation) that magnetic perturbations are most energetic when the sun is most spotted, and *vice versa.*

"For so remarkable a phenomenon as this none but a cosmical cause can suffice. We can neither say that the spots cause the magnetic storms nor that the magnetic storms cause the spots We must seek for a cause producing at once both sets of phenomena. There is as yet no certainty in this matter, but it seems as if philosophers would soon be able to trace in the disturbing action of the planets upon the solar atmosphere the cause as well of the marked period of eleven years as of other less distinctly marked periods which a diligent observation of solar phenomena is beginning to educe."

ARTIFICIAL STONE—THE PROCESS OF ITS MANUFACTURE.

This remarkable and important manufacture is at last not only well established on chemical principles, but carried out on a large commercial scale. Nearly a quarter of a century has elapsed since Mr. Ransome, of London, commenced his experiments in this direction. Like all pioneers in similar enterprises, he encountered grave and repeated difficulties—not more, however, from the intractability of materials than public unbelief. It was not until 1861 that he discovered the complete and certain process now employed, and to-day, builders at large are but beginning to recognize the proofs of the new material, and to admit its superiority. For years the concrete stone has been subjected to every test that ingenuity could devise—to heat and frost—to water, fresh, salt, and impure, to wash and attrition, and to every atmospheric exposure. Very few natural stones are as durable or as uniform, and the best of them are costly, and, in many localities, inaccessible.

But the comparative cheapness and durability of the artificial stone are of no greater importance to architecture as an engineering art than to architecture as a fine art. The enormous expense of cutting shapeless rocks into the exact and elaborate forms of beauty, prevents the general adornment of structures. But when the beautiful form may not only be *cast in a mold,* but endlessly reproduced from the same mold as easily as the ugly form; and when the most florid ornamentation may be more cheaply molded than the plainest and most unrelieved outlines can be cut, there will be no further excuse for the monotonous, ugly, or cheap looking buildings that characterize street architecture, especially among the Anglo-Saxon peoples.

Those who have occasion to study in detail, or to practice the new art, should read the various illustrated and technical articles upon it in the London *Engineering.* The general features of the process are as follows: We quote from the New York *Times,* which presents a resumè of the subject, the points being taken from English exchanges, and presented in as brief and clear a form as we could hope to do:

"Mr. Ransome's patent concrete stone consists of sand united, not by any mechanical sticking compound, but by chemicals which transform it into a new and homogeneous mass. It is particles of sand, in some cases mixed with a little limestone, united by silicate of lime. The manner of forming this silicate of lime in the mass is, in fact, the essence of the invention. The sand is mixed with a viscid solution of silicate of soda, which produces a pasty mass, readily molded. When the required forms are produced they are treated with a solution of chloride of calcium, when the silicic acid and the oxygen of the silicate of soda combine with the calcium of the chloride of calcium and form silicate of lime, while the chlorine of the chloride of calcium unites with the sodium and forms chloride of sodium (common salt), which is afterward washed out. But Mr. Ransome had no sooner discovered *how* to provide for the chemical reactions than the commercial problem of cost of materials assumed very serious proportions. Silicate of soda, the chemical upon which the process hinges, was, indeed, produced by two modes, both of them, however, expensive, and neither of them adequate in degree. The solution was too weak to answer his purpose. The scientific importance and the practical difficulty of the improvement, therefore, lay—just as they did in the Bessemer and other processes—not in making the desired material, but in making a material with which to make it. Mr. Ransome's great invention was the production of silicate of soda under pressure. While powdered flintstone, boiled in a solution of caustic soda, at the atmospheric pressure for many hours, would yield but a weak and inadequate fluid, whole flints so boiled, under a pressure of sixty pounds, readily dissolved and formed a strong silicate of soda.

"The first process is drying the sand by letting it slide down through an inclined revolving cylinder, warmed by a blast of heated air. The sand is then sorted in bins, according to its fineness. The silicate of soda is prepared in a boiler resembling a cylindrical steam boiler. The flints are laid on a grating in the boiler, the caustic soda fills the boiler, and the heating is done by steam pipes introduced into it from a steam boiler. The solution thus obtained is further strengthened by evaporation in a tank furnished with steam heating pipes.

"The mixing of the dry sand and the sticky, liquid silicate of soda, is done by a kneading mill consisting of iron wheels, with projections, rolling in a trough. From two and one fourth to three bushels of the sand, or sand and limestone, are thoroughly mixed with one gallon of the solution (which has a density of 1.7), and the pasty mass thus formed has just enough cohesion to enable it to be molded. The molding consists simply of forcing the paste, a little at a time solidly into molds, which are then removed, leaving the perfectly shaped but fragile figure. The molds that are repeatedly used are made of iron.

"The next process is to change the molded mass, now weaker than plaster, and hardly stronger than putty, into stone; and this rapid and all important process exhibits a mechanical expedient not more remarkable than the chemical reaction. It had long been the custom to pour the petrifying liquid (chloride of calcium) over the figure, or when the latter was of suitable shape to be lifted, to immerse it in the liquid—the complete penetration in either case requiring a long time. The ingenious method now practiced is to connect a cavity left in the molded figure with an air pump, which, by exhausting the pores in the mass from within, allows the solution poured upon the exterior surfaces to be rapidly forced in and throughout the mass. In a few moments the stone is hardened, or rather created so that it can be handled with impunity. But to thoroughly expel the air, and to perfect the chemical action, the stone is further boiled in the solution of chloride of calcium (lime water) by means of tanks and steam pipes. These tanks are arranged in a row on one side of a railway, and on the other side there is a series of shower baths, by which the chloride of sodium formed in the stone is washed out. Drying now completes the process, and this is effected in the open air in summer, and in warm rooms in the winter.

"The sharpness of outline and the beauty of the finish are all that could be desired In this regard it differs radically from sanded wood, stucco, and painted iron, which, when intended to imitate stone, invariably look cheap. The concrete stone, however, is not an imitation. Its color is also excellent, and may be considerably varied.

"The Patent Concrete Stone Works, where these operations are carried out on a very extensive scale, are situated on the Thames, at East Greenwich, below London."

Strength of material is not incompatible with grace of form. The artistical mechanic combines both.

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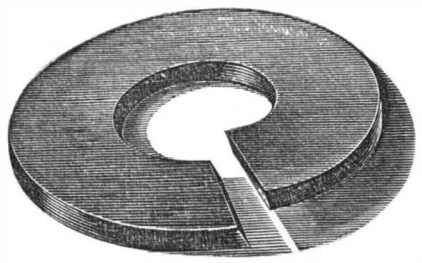
SHAW'S LOCK WASHER.

In all the immense detail of railroads there is nothing more numerous than bolts and nuts, the object of which is to unite the many parts of the cars together and to secure the numerous joints of rails, which object the bolt only temporarily fulfills, as there is a great tendency to divorce, or separation between the bolt and nut consequent upon continual jars.

The constant concussion of a running train upon the rails and the many parts of the cars, causes the nuts and bolts to become loose, and frequently to fly off when applied in the ordinary way. The vexation to railroad men from this cause is great, and has induced them to adopt various and extraordinary means to overcome the evil. The most common method is to employ two nuts on one bolt, which is so limited a security, that it is found necessary to rivet the bolt after the application of the two nuts on locomotive trucks, and many other places, which operation secures the nut from turning, but converts the bolt into a rivet, and ceases to have any advantage that belongs to a bolt, in time of repairs, etc., as the bolt must then be cut or otherwise destroyed. Another method is to employ perforated sheet iron with a ragged exterior, the many points of which are intended to be bent around and



against the sides of the nut, which offers a pointed exterior not very unlike saw teeth, favorable to tearing clothes and incompatible with wiping or painting, and necessitates a rebending back of the iron points every time the nut is to be turned, which repeated bending of the iron breaks it, making this method of very limited and uncertain utility. Other methods are to employ keys and rubber washers, the former of which is troublesome and expensive, and the latter is perishable and costly ; and neither are sufficient remedies.

For these reasons, Thomas Shaw, of Philadelphia, invented a most simple and sufficient remedy, seen in the engraving. Mr. Shaw's method is to make a plain steel washer, cut through one side with shears, which makes it like one coil of a spiral. The edges on which the nut presses, are made sharp, and the spiral is in a direction that allows the nut to travel freely over it when being tightened, but the edge catches into the nut when turned back, sufficiently to prevent the nut turning by any jarring, but yielding to the force of the wrench, and two nuts are no longer necessary ; thus furnishing at once a complete remedy, and a cheaper appliance, adapted to all bolts now in use ; and they cannot be wrongly applied. They are substituted for the plain washer ; and it does not matter which side is next to the nut.

Patented April 28, 1868. Address Messrs Furbush & Gage, office 118 Market st., Philadelphia, Pa., manufactory Camden, N J., manufacturers of this article for railroads and other purposes, from whom any further information can be had.

The Planet Mars.

It appears from the searching scrutiny of the spectroscope that the planet has an atmosphere, and that the atmosphere most probably resembles our own in general constitution. Combining this evidence with that which we already possess of the presence of water in its liquid, vaporous, and solid states upon the surface, and with the certainty that the red tint of parts of the planet is due to a real ruddiness of substance (corresponding to the tint of certain soils upon our own earth), we cannot but recognize the extreme probability that in all essential habitudes the planet Mars resembles our own earth. One circumstance may at first excite surprise, namely, the fact that in a planet so much further from the sun than our earth, there should exist so close a resemblance, as respects climatic relations. But if we consider the results of Tyndall's researches on the radiation of heat, and remember that a very moderate increase in the quantity of certain vapors in our atmosphere would suffice to render the climate of the earth intolerable through excess of heat (just as glass walls cause a hothouse to be as an oven long after the sun has set), we shall not fail to see that Mars may readily be compensated by a corresponding arrangement for his increased distance from the vivifying center of the solar system.

Photography.

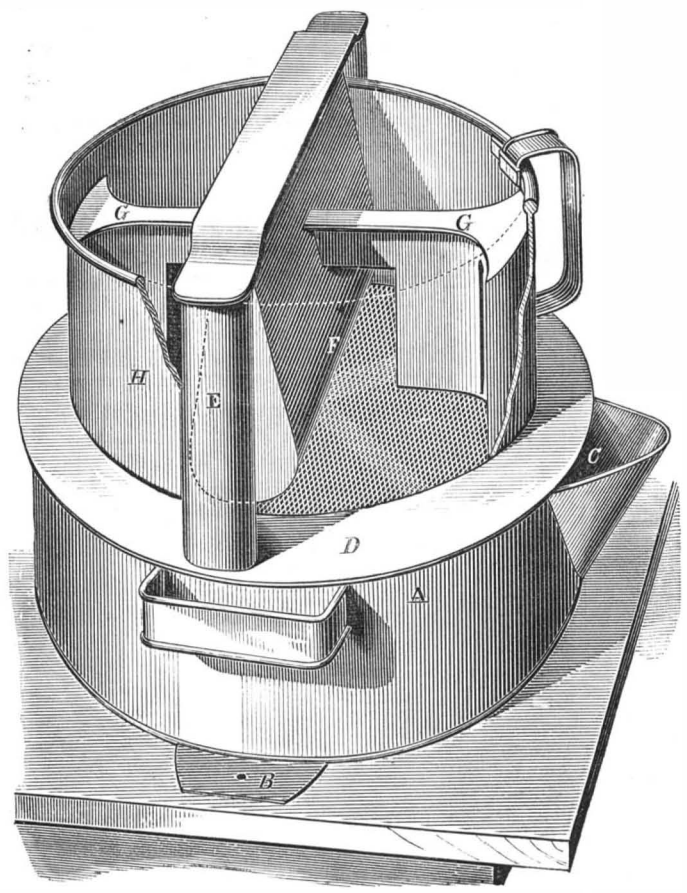
Producing Colored Pictures.—Various attempts have been made to obtain photographs of objects in their natural colors. These attempts have been so far successful as to produce photographs in which every color of the original was faithfully represented ; even the iridescent colors of the peacock's feather have been beautifully photographed. It is, however, not yet quite certain whether any means have been discovered by which the colors can be permanently fixed, as hitherto they have slowly faded away, and become one uniform reddish tint. It is generally admitted that, up to the present time, the most successful photgrapher in producing colored pictures is M. Niepce de Saint Victor, whose process is this : He takes a daguerreotype, or silver coated plate, and dips it into a weak solution of hypochlorite of sodium, having a specific gravity of 1·35, until it has assumed a bright pinkish hue. The plate is then covered with a solution of dextrine, saturated with chloride of lead ; it is then dried, and subsequently submitted to the action of heat for several hours until the temperature of the plate reaches from 95° to 100°, or else expose the plate to the rays of the sun as a substitute for artificial heat, under a sheet of paper which had been steeped in an acid solution of sulphate of quinine. The plate is then ready to be placed in the camera obscura, and to receive the colored picture of the spectrum, or any other object. It is said that he has succeeded in increasing the stability of the colors developed on the sensitive surface by covering the plate with an alcoholic solution of gum benzoin. This branch of photography has been called Heliochromie.

Decorations of Porcelain, Glass, etc.—A very important economic application of photography to the decoration of porcelain, glass, etc., with gold, silver, and other metals, consists in producing an ordinary silver image on a collodion film, and then, by toning processes, converting this image into any other metal which may be necessary. For a gold design the image is toned with chloride of gold ; for a design the color of steel the image is toned with chloride of platinum ; for a black metallic design the image is toned with chloride of iridium ; for a brown design the image is toned with chloride of palladium. A design in a metal of one color can be obtained by first toning the image by the proper metallic salt, and then saturating the film with a solution of some other salt. The collodion film, treated in the manner indicated, is then transferred to the porcelain, and the salt reduced to the metallic state by heat.—*Humphrey's Journal.*

MRS. JONES' PATENT AUTOMATIC SIEVE.

In preparing pulp of squashes, apples, tomatoes, currants, etc., for pies, ketchups, jellies, or other housewifery manufactures, the material must usually be left to cool to such a degree as not to burn the hand when straining it through a sieve, cullender or coarse cloth. If this work could be done while the pulp is hot, much of the material now wasted might be saved. This is the object of the present invention.

The lower portion, A, is a pan of tin, secured to a table or bench by means of pins through ears, B, on either side. This holds the sifted material which may be poured out through the spout, C. Setting in the top of this pan is an annular flanged ring, D, having posts, E, on each side, with a cross piece supporting a presser, F, having a rounded bottom, and



two transverse arms, G, having concave heads intended to force the pulp in toward the presser and prevent it from adhering to the sides of the vessel, H. The bottom of this vessel is of wire gauze, as any sieve, and a projecting flange on it fits between that of the bottom vessel and a ring under the flange, D. This ring has two transverse bars extending across and serving to scrape the sifted pulp from the bottom of the seive. The upper vessel, H, containing the unsifted material, is partly rotated back and forth by the removable handle, I, the scrapers, G, conveying the material to the presser, F, the concave bottom of which, reaching nearly to the wire cloth, forces the pulp through. All the parts of the utensil may be separated easily for washing and drying.

This handy utensil was patented through the Scientific American Patent Agency, Aug. 11, 1868, by Mrs. J. D. Jones, who may be addressed relative thereto at 132 Newark avenue, Jersey City, N. J.

A French physician has found by experiment that when six drops of absinthe are placed in a quart of water, fishes will die more quickly when put in the mixture, than would be the case were the same amount of prussic acid contained in the water. The experiment only confirms the fact already well known that this drink is poisonous in common with all other strong stimulants. It may however have the effect to retard somewhat the growing use of absinthe in this country.

Chronometers.

Probably no mechanical operation involves greater nicety of work—except that of making the corsets of Eugenie or the moustache dye of Louis Napoleon—than the work involved in making and rating a strictly first class marine chronometer. Almighty Power has endowed the needle of the mariner's compass with the instinct of pointing to the north ; but the navigator with compass alone could not trust himself with a valuable cargo upon uncertain waters, and successful navigation depends upon the accuracy of the chronometer.

There are in the entire United States but six makers of marine chronometers, and even these combine with the profession the making of chronometers for pocket use. Once made, a chronometer virtually lasts forever, and the demand for the article is so limited that, generally speaking, they must be ordered in advance of the necessity for their use. Of the six American makers of these delicate time-keepers, the oldest and confessedly the most experienced is a quiet gentleman, a devotee of astronomical science—literally a star-gazer—whose place of business is at No. 407 Chestnut street. Upon the roof of his building Mr. Harpur has constructed an observatory, in which each day he takes and registers the astronomical and mean time—a great deal more for his own satisfaction than for pecuniary return.

It is a privilege to ascend with him to the summit of those four stories, and watch him with quadrant, sextant, and other scientific instruments, verifying or altering the second of the minute in his chronometers, as the case may be. It is the more interesting because there is nothing lucrative in the profession. Makers of many kinds of scientific instruments realize handsome returns from their toil. Mathematical, optical, engineering, and other instruments are in constant demand. A marine chronometer is the representative of a ship, for no ship requires more than one of them. If a vessel is wrecked, and anything be saved, the chronometer is the first article of property that is taken into the life boat ; so the result is that the market is well supplied, and that the demand for the exquisite timekeeper is extremely limited.

The makers in this country import none of the material they employ excepting the brass frame in which the movement is inclosed. To produce a single one requires the constant labor of the maker for from two and a half to three months, and three months at least are required after it is finished to rate and regulate it. To get a chronometer from a Liverpool maker it must be ordered —unless the man have one on hand—from nine months to a year in advance of occasion for its use. England is the chronometer maker for all Europe. The Swiss make the cheapest watches in the world, just as they make cheap music boxes, cheap pictures, and curiosities in carved work. But their watches lack the solidity of those of English make. Any reader of Dickens who can recall the description of Mr. Gradgrind's watch, with its "gnashing" tick, will comprehend the difference between it and the general tap of the escapement in the watches of Lochle or Geneva.

But the Swiss have never yet made reliable chronometers. They are too far inland to render the study an object, and the astronomical accomplishment necessary to rate them. The man who can "rate" a chronometer—give him the nautical skill to handle her, and the necessary charts—could of course sail a ship in any waters.

Our veteran Philadelphia maker, Mr. Harpur, seems to be widely known. He has made about two hundred marine instruments, which he modestly thinks is more than have been made by any one gentleman, so far, in the United States. An item of information which our reporter did not get from him, is that Semmes, after taking a Philadelphia ship, and finding one of Harpur's chronometers on board her, displaced the instrument he had in use and substituted Harpur's in its stead. That chronometer was in the cabin of Semmes, on the Alabama, when she went to the bottom of the English channel. The ocean vagabond had as many as twenty chronometers at a time, taken from vessels that he had burned, but he gave the preference over English, French, and all others that he had captured, to the one made in Philadelphia. The thief is not as stupid as he appears, when chronometers are the test of his intelligence.

The cost of a first class ship's chronometer is about $400. It would be much more, but that the larger the instrument the less jeweling it requires. What we mean by this is that the frame is sufficiently heavy to sustain the shafts in their bearings without the aid of many jeweled holes Perfect *fac similes* of the mariners' chronometer are made for the pocket, but to possess one is an expensive luxury. In a plain silver case, four hundred and fifty dollars is about the average price. Each shaft must be inserted at either end in a ruby, sapphire, or diamond, drilled for the purpose. A large portion of the work must be done under a magnifying glass. In the whole range of mechanics or arts there can be nothing, excepting steel plate engraving, that is more trying to the eye.

Chronometer making could never be adopted as a profession by any other than a man who loves science more than he loves silver. More of the pocket sizes are sold than those constructed for a stationary position in the captain's cabin of a ship. A gentleman who chooses to give five hundred dollars for a pocket time-piece gets a chronometer, but very few people care for that degree of accuracy in a watch that puts to the blush the town clocks, and time-pieces in the pockets of friends. For this reason, whenever our reporter passes the observatory of our Philadelphia chronometer, and ponders

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upon the sacrifice that he makes to science, his hat, won at the last election, is tenderly and deferentially doffed.—*U. S. Gazette.*

Cider Making.

Portable cider mills that can be worked by hand are very convenient and useful, when there are but few cider apples to be worked up. It often happens that a farmer has a few bushels of apples that will not keep till the time of making the main crop into cider, and in this case a portable cider mill will enable him to use them to advantage; but when there are several hundred bushels of apples ready at one time, the old fashioned custom of taking a load of apples and straw to the nearest cider mill is the pleasanter, and we believe the more profitable plan. It is a kind of holiday for the boys. The apples are allowed to hang on the tree as long as the wind and frosty nights will let them. The riper they are, the better the cider. They are picked up and placed in a large heap, either in the orchard or at the cider mill, and are allowed to lie a few days to complete the ripening process, in which the starch is converted into sugar. They are then rasped or ground into pulp. If the weather is cool and the apples not quite ripe, it is better to let the pulp remain in the vat a few days before pressing out the juice. This gives the cider a higher color, makes it sweeter, and of better flavor. The process of pressing is simple, but requires some skill. Four boards about six inches wide are nailed together in a square, the size it is desired to make the cheese, say from four to five feet. This is placed on the bottom of the press, and a little clean rye or wheat straw, pulled out straight into bundles, is put inside with the ends extending about a foot all around. The pulp is then put into this rim forming a layer about six inches thick; the straw is then turned on it, and a little pulp placed on the straw to keep it down. The rim is then lifted and a stick is placed at each corner on the layer of pulp added and the straw turned over it as before. This process is repeated until the cheese is as large as desired, using say from seventy-five to a hundred bushels of apples.

The cider will commence to flow at once, and it is better to let the cheese settle down somewhat before turning the screw. If pressed too much at first, the pulp may burst out at the sides. The cheese is generally allowed to remain under the press all night, and before leaving in the evening, the screw is turned as tight as possible. In the morning additional pressure is given, and when the cider has ceased to flow, the screw is turned back, the boards taken off, and the corners of the cheese are cut off with a hay knife and the pomace laid on the top. The pressure is again applied, and the cider will flow freely. As soon as it ceases, remove the pressure and cut off four or five inches of pomace from the sides of the cheese, place it on top, and apply the pressure again as long as any cider will flow. Eight bushels of good apples will make a barrel of cider. The cider is usually put in barrels at once and sold while sweet.

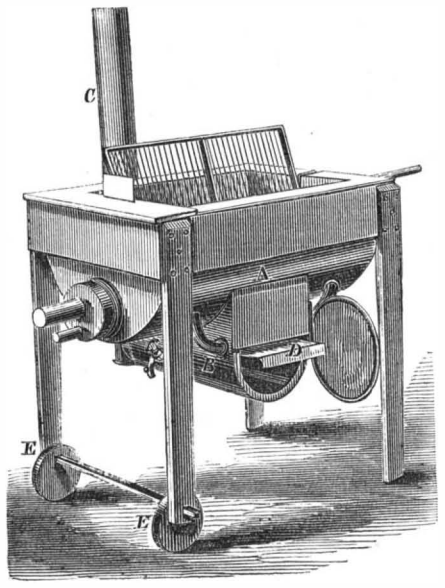
Strictly speaking, we suppose the sweet juice of the apple is not cider, any more than the sweet juice of the grape is wine. It is converted into cider by fermentation. Those who prefer sweet cider resort to various methods for arresting this process, such as putting a handful of powdered clay into each barrel, or two or three pounds of well burned charcoal. Others add a little mustard seed. Sometimes a few gallons of cider are placed in the barrel, and then a rag dipped in brimstone is attached to a long tapering bung; this is ignited and the bung loosely inserted. After the brimstone is consumed, the barrel is rolled until the cider has absorbed the sulphurous acid gas. The barrel is then filled up with cider. The sulphurous acid gas acting on the albuminous matter in the cider arrests fermentation. The objection to this method is that, if too much gas is absorbed, it may prove unpleasant if not injurious. To obviate this, sulphite of lime is now used, which has the property of checking fermentation. We have tasted cider preserved in this way that was excellent, and we have also tasted some that was execrable. It is not an easy matter to keep cider sweet and pure for any length of time, especially if the weather is warm. If the cider is not made until just before winter sets in, and can afterwards be kept at or near the freezing point, it will remain sweet and excellent.

To make good fermented cider that will keep a year or more without turning too sour to be used for anything but vinegar is not a difficult matter. The first thing is to exclude all decayed fruit, but it should be quite ripe. Not a drop of water should be used in the process of manufacture. The sweeter the juice, the stronger the cider, and the better it will keep. Put the barrel immediately in a cool cellar—the cooler the better. The fermentation may go on slowly or rapidly, practice differing in this respect. In the former case the liquid is treated in all respects like wine. The cask has a bung in which is fixed air-tight a tin tube bent at right angles, or a piece of india-rubber tube. The free end of the tube in either case dips into a vessel of water. This arrangement allows the gases liberated in fermentation to pass out, and the end of the tube being covered with water, air cannot pass in. The bubbling of the gas through the water shows how the fermentation is progressing. When this has ceased, the cider is racked off into clean casks, which are to be full and bunged tightly. The following treatment is communicated by an English friend, which he assures us is attended with good results. Most readers would probably prefer their cider and beefsteak separate.

"Put into the barrel of cider five or six pounds of loaf sugar, and a pound of raw, lean beefsteak. Let the bung be open; keep the barrel full, so that, as fermentation takes place, the scum thrown to the surface may run off through the bung. Some cider should be reserved to be added every day or so, to supply the waste of fermentation. When all the scum is thus worked off, bung up the barrel tightly and place a few handfuls of wet sand on the bung, pressed firmly to exclude the air."—*American Agriculturist.*

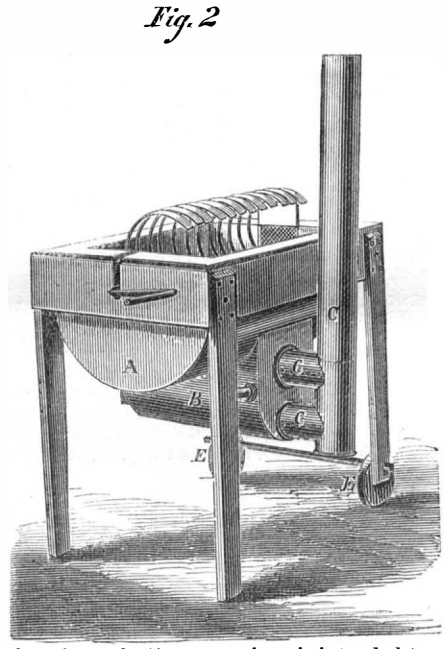
COLVIN'S PATENT CHEESE VAT.

CHEESE making in this country, has of late years risen from the position of a merely household industry to the dignity of a distinct branch of our manufactures, and "cheese factories" sound now no stranger to the ear than cotton or woolen factories. Whether cheeses are made at home on the



farm, or in establishments specially designed for their production, the principles governing the processes of manufacture are the same, and they must be understood, and corresponding appliances used. The objects to be attained are a separation of the caseous or cheesy particles from the whey or watery particles of the milk and the proper comminution of the former preparatory to pressing.

Fig. 2



The device shown in the engravings is intended to produce these results more effectually, rapidly, and economically than can be done by the ordinary processes. Fig. 1 is a front view of the machine in perspective; Fig. 2, a rear view; Fig. 3, a stirring frame, and Fig. 4 a cutting frame, both these last operated by a crank. The vat, A, is semi-cylindrical and double walled, water being contained between the shells. Under the vat and attached thereto is a furnace, B, for heating the water, the smoke from which escapes by the pipes, C. The degree of heat admitted to the water is regulated by a sliding damper, D, in Fig. 1. A coil of circulating pipes is

Fig. 3.

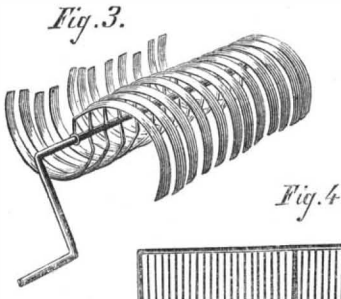
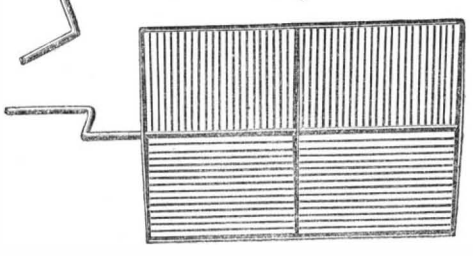


Fig. 4.



affixed to the outer shell of the vat, connecting with the water space at center and ends of the vat, thus equalizing the heat in the water space. Convenient spouts or cocks are attached for drawing off the whey, the water from the water space, and discharging the curd. To aid in this, one end of the machine is set on eccentrics, E. For keeping the curd separate during the operations of scalding, salting, and cooling, a stirring frame, Fig. 3, consisting of curved paddles, is used that is turned by a crank; this does the work usually performed by hand with a paddle. It is seen placed in the machine in Fig. 2. The cutting frame, Fig. 4, seen in place in the vat Fig. 1, cuts the curds into small blocks by the longitudinal and transverse cutters on the rotating frame. This not only cuts the curd, but by its sweep cleans it from the inner surface of the vat. Either of these revolving frames may be lifted instantaneously from the vat, as the shafts bear at one end on a fixed pin, and at the other rest in an open box.

At the discharge end of the vat—Fig. 1—is a semi-circular recess separated from the vat proper by a strainer plate sliding in vertical grooves in the inner shell of the vat, and can be withdrawn vertically when the curd is to be discharged into the hoop of the press.

Patented July 28, 1868, by Paschal Colvin, who may be addressed for machines, rights, or further information at Pecatonica, Winnebago Co., Ill.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Chrome Iron.

MESSRS. EDITORS:—The use of chromate of iron, or chrome ore, for hardening iron, has long been known; but it is only recently that attention has been paid to its practical use for this purpose, the chrome ores having been almost exclusively used for the manufacture of bi-chromate of potash for coloring purposes. Late experiments have demonstrated its superiority as an alloy for hardening steel, and for the manufacture of burglar proof safes, resulting in the formation of a company in New York with a capital of $400,000, for the manufacture of chrome steel, which is now before the public for commercial purposes, in quantity and of a quality not surpassed (if equaled) by any steel heretofore produced. The chrome iron safes are cast, and are impervious to acids or drills, and the material is by far the hardest metal ever discovered.

According to Berthier, iron and chromium (metallic chrome) may be alloyed in every kind of proportion; an alloy containing 60 per cent chromium scratches glass almost as deeply as a diamond, its hardness is so great. These alloys may also be made with chrome iron ores, by using a flux to retain the silica and alumina which may be present in the ores. A good flux for this purpose is a mixture of 100 parts glass (free from lead), and 40 of glass of borax, to 100 of ore.

According to Fremy, an alloy of iron and chromium may be formed by heating, in a blast furnace, oxide of chromium and metallic iron; it resembles cast iron, and scratches the hardest bodies, even hardened steel.

Experiments are now being made at four of the largest rail mills in the United States, in order to test the value of an alloy of chrome ore and manganese, with the iron in the puddling furnace, for hardening rail heads, and with every prospect of a successful result. The United States Government has ordered an experimental lot of projectiles to be made of chrome iron, or chromated iron, in order to test the penetrability of projectiles thus hardened upon iron plated armor; and while these experiments are going on for purposes of destruction, other experiments are being made to test the value of the process for the peaceful purpose of hardening plow castings, railroad car wheels, and other articles of iron fabrication, where there is great wear from friction, and requiring to be made very hard.

The supply of chrome iron ore in this country is quite extensive; and it is found of superior quality at the Bare Hill, about six miles from Baltimore, in Harford County, and in other parts of Baltimore County, and many parts of Chester, Delaware, and other counties of Pennsylvania; and if required, can, no doubt, be supplied from these sources in any quantity demanded by the most of the iron manufacturers.

Baltimore, Md. C. L.

Steam Boilers and Steam.

MESSRS. EDITORS:—I saw an account of an experiment that a Frenchman tried on a steam boiler in France, several years ago, which increased the power of his boiler one half. It was in the SCIENTIFIC AMERICAN that I saw it, but do not recollect the date. He attached an air pump to his engine, and forced air into his boiler with the feed water. If that is a fact, why has it not come into general use? And is the thing practical or not? What is steam? If it is water expanded by heat, why does not the whole body of water expand and fill the boiler, and why does it not increase the pressure of steam by superheating it?

Make a fire under your steam boiler, without any water in it, and you can get no pressure in your boiler; add water, which is incompressible, and you get an elastic fluid or gas. Is making steam a chemical or mechanical process? Is the evaporation of water by the sun's rays, or by passing a current of air over the water, the same as making steam in a boiler under pressure? What property does water lose by being converted into steam? I have made steam my study for the past eight years, and my experiments show me some facts in relation to the above questions which I have not seen in print, although they may be old. Your answers to the above questions will be received with much pleasure? E. M.

Boston, Mass.

[Our correspondent has a curt, off-hand way of asking questions difficult to answer in our columns, and more appropriately addressed to writers of works on natural philosophy than to the conductors of a periodical.

In regard to the French experiment—of which, however,

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we have no recollection—we presume it was simply an attempt to introduce air in the water of a boiler, to which much importance has been attached in this country by some. We do not share in the belief of its necessity, but, if required, there are but few feed pumps which do not occasionally force air, without water, into the boiler; and all water forced in ordinarily contains more or less air.

Steam, as defined by Webster, is the "vapor of water; or the elastic aëriform fluid generated by heating water to the boiling point." Thus, steam is not "water expanded by heat," and that is why the whole body of water does not "expand and fill the boiler." It is not the water that expands but the elastic fluid known as steam, two of the qualities of which are dryness and invisibility. It does increase the "pressure of steam to superheat it." Regnault says that steam, at 100 lbs. pressure, which may be considered "dry steam," as usually understood, has a temperature of 338°, but at 230 lbs. pressure it's temperature is 398°+. For further particulars regarding steam we refer you to any of the text books.

Making steam, or rather generating steam from water, is a purely mechanical process. The evaporation of water by the sun's rays or any other cause is making steam as much as is the application of heat to water in a boiler under pressure. In the one case its elasticity or pressure is no greater than that of the atmosphere, while in the other case, by confinement, it may be many times more.—Eds.

"Greasy Mechanics."

Messrs. Editors:—Your article headed as above will meet the approbation and awaken the sympathy of the class whose claims it advocates. There may be many persons who believe that the profession of the mechanic and his labors are inferior in value to those of others in different departments of human labor; but does it occur to these that without the aid of the mechanic, as such, the world would now be at least three hundred years behind in civilization?

Where would have been the steam engine without a Watt? Where would have been spinning machinery without an Arkwright? Where would be the transportation on our rivers, lakes, and oceans without a Fulton? Where the vast agricultural interest in the production of cotton without a Whitney? How should we cross a continent in six or seven days without a Stephenson? How should we converse with our friends across the Atlantic without a Morse? Yet these men were all mechanics!

Who will deny the blessing within the reach of every family introduced by Elias Howe? We know that he was a mechanic working for nine dollars a week during the day time and toiling nights in his attic to bring out the conception of his brain, the sewing machine, which to-day blesses the whole civilized world.

And allow me here to say, that of all the almost infinite variety of these, not one successful one that does not combine his ideas, thereby paying tribute to his genius.

The works of our mechanics, the services they have rendered to civilization, to Christianity, to liberty, to the amelioration of the condition of mankind, are their monument—their eulogy. Mechanical Engineer.

New York city.

Something About Hemp.

The comparative value of different sorts of hemp, as it regards durability, is easily and speedily tested by any one, since nearly all kinds are very short-lived when exposed to causes favorable to decay. The Manilla will last some four or five months, as used in the summer season upon our steamboats. The Sisal, which is often sold under the name of the former, will not last more than half as long. The Russian hemp, when kept moist and warm, will lose its strength in about three weeks; the American water-rotted in two weeks, and the dew rotted in from five to ten days. Different experiments, however, exhibit different results in respect to the durability and strength of the various kinds of hemp.

In Russia, hemp is assorted, according to its quality, into clean hemp or firsts, out-shot hemp or seconds, half-clean hemp or thirds, and hemp codilla. Of the first three sorts an immense amount is annually brought from the interior beyond Moscow, its quality very much depending on the region in which it is produced. That brought from Karatshev is the best; next to this, that produced in Beteo; hemp from Yshatsk is considered inferior to the latter. As soon as the hemp is brought down in the spring, or in the course of the summer, it is selected and made up in bundles with great impartiality and exactness. A bundle of clean hemp weighs from fifty-five to sixty five poods; a bundle of the out-short, forty-eight to fifty-five; and a bundle of half clean, forty to forty-five—one pood being equivalent to thirty-six pounds. The external marks of good hemp are, its being of an equal, green color, and free from spills; but its good quality is proved by the strength of the fiber, which should be fine, thin, and long. The first sort is quite clean, and free from spills; the out-short is less so; and the half-clean contains a still greater portion of spills, and is, moreover, of mixed qualities and colors. The part separated, or picked out in cleaning hemp, is called hemp codilla, and is generally made up in quite small bundles.—*Commercial Bulletin.*

Twenty years ago, Grace Church, opposite Eleventh street was placed a short distance above the fashionable quarter of New York. Now it is so far down town and business presses upon it so closely that the society propose to sell out and remove further up town. The ground is valued at $600,000. The old New York Hospital between Duane and Worth sts., one of the ancient landmarks of the city proposes to move away from its present valuable site. We have heard the ground estimated to be worth as high as four million dollars.

Manufacturing, Mining, and Railroad Items.

Carbonate of lead has been discovered in St. Francois county, Mo.

The new cotton mill at Suncook, N. H., will be, it is said, the largest building in the State.

A lumber mill at Portsmouth, Mich., recently cut 130,352 feet of lumber in ten hours and forty minutes.

A mill for manufacturing wrapping paper, and eventually print stock, will soon be erected in Nebraska city.

A bismuth mine has been opened in Wayne county, Mo., that aside from its value in bismuth is rich in silver.

The Shawmut Oil Company, at East Boston, runs fifteen stills, having an aggregate capacity of five hundred barrels of oil per week.

A company has been formed in London for the manufacture of beet root sugar on a large scale. This business is growing rapidly.

The Iron Mountain, in Dent county, Mo., is to be examined by Pennsylvania iron men with a view to making pig iron.

The largest vinegar manufactory in the country is said to be at Detroit, Mich. Its capacity is five hundred barrels per week.

An English company have after overcoming almost insurmountable difficulties established extensive iron works at Zimapan, in Mexico.

The Rhode Island Locomotive Works are turning out locomotives at the rate of five per month. The capacity of these works is soon to be doubled.

The Trenton Iron Works at Trenton, N. J., have been purchased by the Erie Railroad Company and are to be removed to some place on the line of the road.

A copper kettle of 1,540 gallons capacity, has just been put into a brewery at Zanesville, Ohio. The bottom of the kettle is a solid piece of copper weighing 875 pounds.

The locomotive business seems to be lively. A firm in Boston has just been obliged to decline an order for $200,000 worth.

A new artillery locomotive has been invented, armed with two pieces of artillery, and intended to perform scouting duty on the banks of the Rhine.

The Emperor of China has opened the port Chifau, on the Gulf of Pechele to foreign trade.

A new deep sea submarine telegraph direct from Malta to Alexandria Egypt, was successfully completed on the 2d inst.

The Pennsylvania Central Railroad has reduced its freight charges to all points in the West, to correspond with those of the New York roads.

Considerable excitement prevails at Laramie over new gold discoveries forty miles west of that place, said to be richer than any that have been made in that section.

Chemical manufacturing, though quite in its infancy on the Pacific coast, is already entered upon by competing firms which display considerable energy within the limited field opened to them by the demands of the market.

Some of the copper ores from the Planet mine in Arizona embracing carbonates, sulphates, silicates, the red oxide, and native copper, are said to assay from 50 to 60 per cent of copper.

There are thirty-two manufacturing establishments in North and South Adams, Mass., having an aggregate capital of ten millions of dollars, and employing from 3,000 to 4,000 hands.

Great excitement is reported in the western portion of Idaho concerning the discovery of gold in the Cœur d'Alene Mountains. The road is crowded with miners from Beartown to the new diggings. The precise location of the mines has not been announced.

The Winnemucca *Argent* says: "At no time in the history of Humboldt mining has there been more well-directed labor put upon mines, and in no instance that we know of is it being done for other than purposes of permanent development."

Hartford will soon vote on subscribing $500,000 for each of the two railroad enterprises now being agitated—the Valley Railroad and the Connecticut Western. It is thought by its leading men that the vote will pass in favor of the roads.

One of the great railway companies of England is about to defend itself against several suits for damages, for having set fire to the crops along its route by sparks from locomotives. It disputes its liability in such cases. Other lines which have suits pending are awaiting the result with great interest.

The principal seat of the saddle tree manufacture in this country is St. Louis. There are ten firms engaged in the business in that city. Hackberry and sycamore are the principal woods used, and the aggregate value of the product foots up from $200,000 to $300,000 annually.

The *Industrial American* says that buckwheat has been made use of in dyeing wool. An infusion made from the succulent stems and blossoms, with the addition of a preparation of bismuth or tin, produces a beautiful brown color. From the dried flowers are obtained different shades of green. The Siberian buckwheat yields a fine yellow which, when the wool is still further boiled in the dye, changes into a golden tint and at length becomes a beautiful yellow.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents

Rail Joint or Coupling.—E. G. Patterson, Pithole City, Pa.—This invention has for its object to furnish an improved coupling or joint for the rails of railroad tracks, which shall be so constructed as to securely connect the ends of the rails to each other without weakening the said rails by the formation of bolt holes, and in such a manner that the said ends may receive a steady straining support.

Governor for Water Wheels.—James P. Sibley and Arthur Walsh, Bennington, Vt.—This invention relates to a new and useful improvement in governors designed more especially to be applied to water wheels.

Brake for Sewing Machines.—James S. Fowler, Racine, Wis.—This invention has for its object to furnish an improved brake, designed especially for attachment to the Wheeler & Wilson sewing machines, but equally applicable to other machines, which shall be so constructed and arranged as to prevent the machine, when being started, from running backward and thus breaking the thread, and which shall at the same time be simple in construction, effective in operation, and easily applied to any machine.

Car Coupling.—H. C. Glasgow, Cleveland, Ohio.—This invention relates to a new car coupling which is so arranged that it can be easily and cheaply made and kept in order, and also to a new manner of constructing and arranging the flooring of the car between which the coupling devices are held.

Machine for Scouring and Cleaning Sheet Metal.—Horace B. Wooster, Waterbury, Conn.—The object of this invention is to clean or scour sheet brass and other similar metal after annealing, either before or after it is finished, without the use of sand or other similar material, and it consists in a novel arrangement and combination of circular wire brushes, movable riders, and a rotating winding-up cylinder.

Children's Carriage.—Francis Boylston, New York city.—This invention relates to a new manner of hanging the front axles of that class of children's carriages which are known under the denomination of "perambulators," and consists in fastening the front ends of the sills to nuts that are screwed to the ends of the axle, said nuts also forming flanges to keep the hubs of the wheels on the axle. By detaching the nuts from the sills, they are free to turn, and can then be taken off the axle, to allow the removal of the wheels. In this manner a very simple and efficient device is provided for retaining the wheels on the axle and for holding the axle on the frame of the carriage.

Apparatus for Lifting and Transporting Sugar Pans.—Andrew J. Weed, Hardwick, Vt.—This invention has for its object to furnish a simple and convenient apparatus for raising and removing the pans from the furnace in sugar houses, which shall be so constructed and arranged that the pans may be removed from the furnace easily and promptly when required, and which shall at the same time be wholly out of the way when not in use.

Cultivator.—D. S. Early, Hummelstown, Pa.—The object of this invention is to improve the cultivator by making it neater and simpler in construction than adjustable cultivators have been made heretofore, and by providing it with novel devices for adjusting the plows, and controlling the depth to which they will run in the ground.

Grain Drill.—M. F. Lowth and T. J. Howe, Owatonna, Minn.—This invention has for its object to provide a simple, cheap, and durable apparatus for regulating the feed of grain drills, so that they can be adjusted to feed one, two, three, four, etc., bushels to the acre, and so constructed and operating that the device can be perfectly regulated, and when necessary its parts can be taken apart and put together again without difficulty, in the field or elsewhere.

Apparatus for Treating Milk.—Joel A. Otis and Thomas Barber, Watertown, N. Y.—This invention is a simple and cheap device for warming milk in the process of manufacturing cheese, and consists in a furnace, boiler, and milk tank, so constructed, arranged, and operating that the heat is applied uniformly at all parts of the tank where it is required, and in such a manner as to utilize all the heat and warm the milk rapidly without scorching or injuring it in any degree.

Steam Generator.—C. F. Trill, Baltimore, Md.—This invention has for its object the construction of a strong and durable steam generator, to be heated by petroleum or other liquid or gaseous fuel.

Horse Hay Rake.—G. M. L. McMillen, Dayton, Ohio.—The object of this invention is to improve the manner of fastening the wire teeth of horse hay rakes to the axle, and of arranging the spring bar and the springs and guides that operate in connection with the rake teeth.

Tea Tray.—S. N. Trump, Baltimore, Md.—This invention consists in making the body of the tray of wood, either in a single piece or in panels, and in extending a metallic rail nearly around its upper edge, the same being supported by short posts or standards, and the whole resting on suitable legs.

Spike.—R. K. Walton, Clarington, Ohio.—The object of this invention is so to construct a spike, for railroad purposes or for common use in spiking planks to timbers, or in spiking timbers together, for ship building or other purposes, that the spike can be firmly imbedded in the wood, so that it cannot be withdrawn or even moved or started in its bed, by any vibration of the wood or of the spike, or by any extracting instrument which will not tear away or remove the wood itself.

Sash Fastening.—William Brown, Duncannon, Pa.—In this invention a single fastening is employed to lock both sashes in any required position. The device is simple, cheap, easily operated, and not liable to get out of order.

Car Coupling.—A. J. Elder, Kansas City, Mo.—This invention has for its object, in addition to the connecting of cars, their uncoupling in a certain and efficient manner, in case one or more of the carriages of a train be thrown from the track, in order that the displaced car may not drag the others after it.

Plow.—S. T. Denise, Redbank, N. Y.—This invention is an improvement in the construction of the coulters, standards, and braces of a plow, whereby the instrument can be made more simple, strong, and durable, and at less expense than heretofore. The plow is, at the same time, so formed that it will not clog, but will clear itself.

Ice Preserver.—Julia W. D. Patten, New York city.—The object of this invention is to provide a neat and cheap receptacle, which will protect ice, food, medicines, etc., from the action of the air, and having its walls made of a substance, herein described, which is a remarkable non-conductor of heat will maintain around the inclosed contents of the receptacle a uniform temperature thereby preventing the melting of the ice and the decomposition of the food, medicines, chemicals, or other article to be preserved.

Butt Hinge.—H. Hockemeyer, Toledo, Ohio.—This invention relates to an improvement in the construction of hinges or butts for hanging doors, and for other purpose.

Drawing and Writing Slate.—F. Melville, New York city.—This invention relates to a new and improved mode of applying a writing or drawing copy to a slate.

Rotary Engine.—Elim Osborn, Economy, Ind.—This invention relates to an improved method of applying steam to a rotating wheel for driving machinery, and for all other purposes for which steam engines are used.

Stave Machine.—James Holmes, Belfast, Maine.—This invention relates to a new and improved machine for sawing staves; and it consists in a novel means employed for operating the bolt carriage, whereby the bolt is automatically fed to the saw, and gigged back from the same, and the bolt also set to the saw, at the termination of the gigging back movement.

Adjustable Ventilating Apparatus.—Jethro Peckham, and John Peckham, Middletown, R. I.—This invention consists in supporting the wedge cover upon vertically adjustable supports, and combining therewith a wind lass for raising or lowering it to open or close the ventilating passage through the wedge.

Reversible Barber's Chair.—Albert Gerdes, and Julius Reiche, New York city.—The present invention relates to a new and useful improvement in barbers' chairs which are so constructed that, by a single movement, the seat, back, and head rest, may be removed, simultaneously. The object in reversing the seat, back, and head rest, is for the purpose of giving each new comer a cool seat, and by thus reversing the parts it will prevent dust and dirt from collecting around the edges, as well as airing the parts at the same time.

Pattern Chart for Cutting Shirts.—James H. Myers, New York city.—The object of this invention is to produce a set of diagrams for men's shirts, which one set will be sufficient for cutting shirts of all sizes for persons of various forms. The invention consists in so forming the diagrams for the various parts of the shirt that those edges which will be changed for persons of different size, will be graduated and numbered, so that when the requisite measurement is known, the necessary line can at once be pointed out.

Folding Chair.—Chas. C. Schmitt, and Rudolph Wodrich, N. Y. city.—The object of this invention is to construct a chair of ordinary or suitable form, in such manner that it can be readily folded together to occupy but little room. This is important, not only for transporting chairs, but also for crowded rooms in which chairs when used can be easily folded into a small compass. The invention consists in pivoting the legs of the chair to the seat of the same, and in connecting their respective braces in such manner that the desired result is obtained, and that the chair, when in use, is entirely firm and reliable.

Slat Matting.—William Barton, Troy, N. Y.—This invention consists in such an arrangement of the cords or strings, by which the various slats are connected into an elastic matting that by winding the string around itself or by tying knots unto the same, the buttons or washers for holding the slats the requisite distances apart, may be dispensed with, the said knobs or windings being the substitutes for the said buttons or washers.

Folding Easy Chair.—Charles C. Schmitt and Rudolph Wodrich, New York city.—The object of this invention is to produce an easy chair, which is so arranged that its seat can be adjusted higher or lower, and locked in any desired position, and that its back can be set, more or less inclined, and taken at any desired angle of inclination.

Feeder and Cooler.—John Nairn, Milton, Ind.—This invention consists of a vessel which is secured to the top of the ball of a running stone, and provided with two tubes extending downward near to the bed stone, with which the article to be ground is fed by a tube fixed to the mouth of the hopper, and extending near to the bottom of the said vessel when it is provided with arms which act as scrapers when the said vessel rotates by the action of the stone, to force the materials into the said tubes. The vessel is also provided with hollow curved arms for gathering and forcing air down through the feeder to facilitate the feeding, and to cool the stones.

Saw Set.—L. T. Smart, Ossipee, N. H.—This invention consists of a circular bed die fitted into a suitable die holder, so as to turn them on a ver-

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tical axis, which is provided with a square socket in its central axis, and with four or any other suitable number of inclined facets on its upper end, varying in degree of angularity which serve as the bed on which the teeth are to be hammered to produce the required set, and a movable die provided with a central shank, which fits in the recess of the bed die, arranged in combination therewith, having a corresponding number of facets of various degress of angularity corresponding with those of the bed die, supported in a vertical position therein, and the facets maintained a short distance above those of the bed die by a suitable spring. The bed is provided with gages, whereby the saw may be presented so that the teeth may be suitably acted upon by the said dies when a blow is given to the head of the movable die.

IMPROVEMENT IN SPRING SEATS.—Charles B. Smith, Springfield, Ill.—This invention consists in forming the main portion of the bottom of the seat of thin strips of metal laid longitudinally and transversely, and riveted at the intersecting points, the end of which strips are provided with hooks, which hook into and are supported by loops projecting from double coiled springs secured to rods or bars connected to the base or frame of the seat.

IMPROVED CARRIAGE WHEEL.—John G. Buzzell, Lynn, Mass.—This invention relates to that class of wagon wheels, in which tight metallic spokes are used, and consists, first, in fastening the out ends of the spokes to springs inserted in the felly; second, in forming annular chambers around the hub for the reception of the inner ends of the spokes, and of the nuts, by which such inner ends are fastened; the chambers allowing the nuts and inner ends to play if the rim of the wheel should be somewhat contracted.

IMPROVED FILTERING AND VINEGAR APPARATUS.—Theodore Grundmann, Cleveland, Ohio.—This invention relates to a new apparatus for making vinegar from suitable fermented liquids, and consists, first, in substituting for the shavings generally employed braided straw, cotton, or hemp, strings, which are held suspended, and along which the liquid has to flow down in small streams.

IMPROVED TRUSS.—John Burnham, Batavia, Ill.—This invention relates to a new and useful improvement in trusses, and it consists in attaching the head lever to the band by means of a ball and socket joint.

IMPROVEMENTS IN NAIL MACHINES.—W. H. Battelle, Youngstown, Ohio.—The object of this invention is to provide an improved nail cutting machine, the improvements being in the arrangement of the nipper, and the means of actuating the method of securing the heading dies, and the arrangement of the feeling apparatus of a machine arranged to form a head alternately on each side.

SOLVENT AND DETERGENT PROCESS.—James G. Marshall, Leeds, Eng.—This invention relates to a new mode of combining the influences of high temperature and great pressure in solvent or resinous matters adhering to the fibres of various fibre yielding plants, or for cleaning fibrous material of animal origin, such as wool or silk, from some of the extraneous matters that may be adherent thereto. I effect these objects by enclosing the material fibres or fabric to be operated upon in a closed vessel or chamber of a shape and strength suited to resist the amount of internal pressure that is intended to be employed to force the solvent or divergent liquids through the fibres when the goods to be operated upon are arranged in the vessel.

LANTERN—G. W. Putnam, Boston, Mass.—This invention relates to a new and useful improvement in that class of lanterns which are designed to be more portable that the ordinary or original kind, and which are adjustable so as to be capable, when not in use, of being or arranged so that one part may be fitted within the other.

PADLOCK.—G. W. Dana, Racine, Wis.—This invention relates to a new and improved padlock and it consists in a peculiar construction of the same, whereby a very simple, economical, and secure lock of the class specified is obtained.

CAR COUPLING.—H. C. Glasgow, Cleveland, Ohio.—This invention relates to a new car coupling of that class in which the coupling box is made backward and forward movable; and its object is to so arrange the coupling box, its connections with the car body and the coupling pin, that the coupling link can be inserted from above or below, even if the cars to be joined should close together; to prevent the bending or breaking of the coupling pin, by the insertions into the box of a link on the opposite car; and to insure safety and convenience, by the construction of the devices which connect the coupling box with the car body.

MILK VAT.—John A. Edwards, Waterford, Pa.—This invention consists of a vat, whereon the milk is to be set, and in which water is used for governing the temperature of the water, and an agitator whereby the water is caused to circulate freely under the milk cans which are suspended in suitable numbers above the water of the vat or so that they come into contact with the water. The vat is provided with a gate to separate the part of the vat to which the heater is connected from the part which the water communicates with the pans when desired.

SKIRT SUPPORTER.—N. A. Vurgason, Brooklyn, N. Y.,—The nature of this invention relates to the supporting of ladies' skirts whereby the weight of the latter is not required to be sustained by tieing the same tightly around the waist with strings or similar fastenings.

HORSE HAY RAKE.—Peter Prescott, Boonville, N. Y.—The object of this invention is to provide a horse hay rake which is conveniently operated, and which is almost if not entirely free from the objectionable downward pressure of the shafts upon the horse drawing the same. Other devices perfecting the whole render the rake of light draft and effective in operation.

HORSE POWER MACHINE.—B. H. Wilcox, Petroleum Center, Pa.—The object of this invention is to provide a simple and portable horse-power machine for the purpose of sawing logs on the spot where the tree is felled, and for other purposes where a simple and cheap machine is required for the transmission of horse-power. It consists in general terms of a cam table turned by a sweep; the cams of the table vibrating a roller lever as the table revolves. The lever is connected with the same or other mechanism by a rod.

CLAMP FOR CROSSED RODS OR TUBES.—James M. Moorehead, Brooklyn, N. Y.—The object of this invention is to provide a firm and easily adjusted clamp for the purpose of clamping the vertical and horizontal rods of engineering or other structures when each crosses each other at right angles and are sufficiently approximated at the line of their line of crossing to admit of being held in the same clamp. It is probably used more in the construction of iron railway cars where two vertical rods and a horizontal rod are clamped together at different points on the top and bottom of the car.

DOUGH MIXING MACHINE.—François Grenier, Beroserac, France.—The object of this invention is to construct a machine for mixing dough, in which the motions of the arms during manual operation are as nearly as possible imitated. The invention consists in arranging within an annular wooden vessel to which rotating motion is imparted, two sets of rapidly revolving stirrers or manipulators, of which one set constitutes the beaters, for agitating the dough, while the other is a set of spiral blades, which move the dough vertically, as is also done by hand during manual operation.

LINIMENT FOR RHEUMATISM.—A. M. Dennen, Folsom City, Cal.—The object of this inuention is to provide a medical compound which is an effective remedy in treating rheumatism by topical application.

WATER GAGE.—H. P. Stafford and H. H. Stafford, Decatur, Ill.—The object of this improvement in water gages is to indicate the hight of water in a steam boiler, so that the attendant can see by the position of a pointer on a graduated limb or index just where the solid water stands, though the water may be foaming to such an extent that this important knowledge cannot be arrived at by means of the ordinary gage cocks, or any other ordinary device heretofore used.

WASHING MACHINE.—John Stafford Kelly, New York city.—The object of this invention is to provide a simple and effective wasning machine. It consists of an oscillating drum or barrel provided with a lever handle or other convenient means of actuating it, and also a number of floating rubbers composed of a canvas sleeve containing a number of wooden balls arranged in a row, together with other devices contributing to the practical operation of the machine.

COMPOUND DOUBLETREE.—John Wykoff, Grant City, Mo.—The object of his invention is to obtain a more equable draft for the three animals and to operate advantageously in other respects. It consists of a double tongue or shafts within which the middle horse works, he being hitched to a singletree, which is attached by a pair of chains, or the equivalent thereof, to the inner ends of doubletrees which overlap each other, and are provided at their outer ends with singletrees for the outside horses. The doubl trees are pivoted to the tongues or shafts' or to a splinter bar affixed across the tongues or shafts.

SCREW PLATE.—John S. Dutton, Jaffrey, N. H.—The object of this invention is to provide a convenient means for cutting any number of screws of equal size with the ordinary screw plate. This is accomplished by means of a gage collar which is movable on the screw which closes the dies, and which is further provided with a set screw to affix it at any point on the said screw, and thus limit the movement of the screw in closing the dies. Suitable marks or indices are engraved on the collar and on the proximate reduced end of the screw plate against which the collar is in contact when the closing of the dies is stopped.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

G. J. W. & Co, Pa.—We know of no glue which is used for uniting pressed horn. It is generally done by heating the horn while compressed.

H. G. B., of Ohio.—The Chapman patent for india-rubber blocks, for shaft couplings has we believe expired. The effort to obtain an extension was futile.

J. J. M., of Cal.—You had better send us a sketch and description of your improvement and we will examine. When you write dont fail to give us your full address.

C. C., of Oregon—We have mailed to your address one of our pamphlets about patents.

P. C. C., of Conn.—A licensee under a patent does not enjoy the right to surrender a patent for a reissue, but he is entitled to the same right under a reissue that he had under the old patent. You have confounded a reissue with an extension of a patent, which are very different proceedings.

P. H., of N. Y.—Judge Curtis decided in 1855, that one owner in common in a patent has as good a right to use and to license others to use the thing patented as the other owner in common has. This we believe covers the point of your inquiry.

E. P., of Ill.—The Tucker bronze is not properly speaking a bronze. It is iron finished so as to resemble bronze. We do not believe it excels other bronzes. The color does not permeate the mass, it is a surface finish.

J. C. M., of Ga.—Horns are marketable, and are employed in the arts for many purposes, which we have not space to specify. A letter addressed to T. Gilbert, dealer in horn, 248 Front street, N. Y. city, will will probably secure all the information you desire.

S. and C. B., of N. Y.—Any cheap varnish that will dry hard is good to fill up the grain of open woods, so as to get a good surface for varnishing. There is a patent filling used by coachmakers which has been highly spoken of but we do not know its composition.

J. McC., of N. J.—The trouble in your case is that it is hard to melt thin sheet copper by itself without oxidizing the metal, which renders it very brittle. We advise you to condense the copper into a solid mass as nearly as may be, before you attempt to melt it. Then cover it with powdered charcoal and cover the crucible tight before applying the heat.

A. M. L., of Minn.—Everything else being equal the increasing the size of the discharge pipe of a force pump will not increase the pressure upon the valves, or increase the power necessary to drive it. Neither will it make any difference whether you discharge into the tank at the bottom or the top. The measure of the force required will be in either case the weight of the water multiplied into the hight to which it is raised.

A. M., of N. Y.—Meerschaum, is a hydrated magnesian silicate, found in serpentine veins in various parts of Europe. The pipes are made by carving, or by pulverising the substance, forming a paste of it, molding, and drying. The Turks formerly made pipes by the latter process but we think the Germans were the first to carve pipes out of the native material.

G. H. C., of Iowa.—The best cement we know of for general use is made as follows:—Isinglass, 2 drachms; soak 24 hours in 2 ounces of pure water; boil it down half, add 1 ounce of rectified spirit, and while it is hot strain through linen. Next melt one drachm of mastic and ½ drachm of gum ammoniac in 1 ounce of rectified spirit; add the latter solution to the first and mix thoroughly. This may be used for joining almost any thing that is broken, but is too expensive to be used as a substitute for glue where the latter will do as well. In cementing, warm the edges of the articles to be joined, and spread the cement over as thinly as will cover the entire surface. Most people use too much.

W. W. T., of R. I—"In looking over your paper for rules for gearing up screw lathes, I find none for the old fashioned lathes with four gears. If there is such a rule perhaps some of the readers of the paper will furnish it. In our shop there is such a lathe and the only way to find the gears is to guess and then figure, and continue until we find the right number." What an "old fashioned lathe with four gears" is we do not know. Ordinary lathes with back gears, whether furnished with a screw or not, have four gears, but not for screw cutting particularly but for reducing speed. If our correspondent means that his lathe has a screw and a change of gears numbering only four, we should suppose that the highly exact method of "guessing and figuring" would not give a very great range of threads that might be cut. Three gears are usually sufficient to cut a screw; one on the live spindle, one on the leading screw, and one intermediate. The rule is so simple it would seem to be hard to go astray: Divide number of threads in proposed screw with the number in leading screw, and the quotient and 1 compared give the relation between the two gears required. Thus: leading screw, 4 threads to the inch; proposed screw to be cut, 12 threads; 12 divided by 4 equals 3. Or, assume a number for a multiplicand, using the number of threads as multiplier; thus: assume 6; then 6 multiplied by 4 equal to 24 which is one gear. 6 multiplied by 12 equals 72 which is the other. In either case the relation of the teeth of the gears is as 3 to 1. Of course the intermediate gear may be of any size so it connects the two; as the rule is "a tooth for a tooth."

J. P. W., of Mass.—Hair cloth is made in this country. The warp is either cotton or silk, and the filling hair from horses' tails. The width of the cloth is governed by the length of the hairs, they being assorted for that purpose.

H. & Co., of Pa.—We can recommend nothing as equal to the hair felting, now extensively used, as a "covering for steam pipes to prevent condensation." As a non-conductor it is as nearly perfect as any material or method with which engineers are acquainted.

P. McK., of N. J.—Your acknowledgment that the force of the blow of your favorite, the trip hammer, depends largely on a spring admits our position and confirms the statements we made on page 195 current volume.

C. W. T., of S. C., is an apprentice in the Phœnix Iron Works, Charleston, and asks what he should do to become a first class engineer (probably mechanical); and why there is no power gained by the use of the lever We are always willing to reply to requests from apprentices for information, although we must repeat our instructions not unfrequently. To become a first class *anything* requires attention to the details of the business, a practical acquaintance with it, a knowledge of its principles—the why and wherefore—and untiring perseverance. All these the apprentice can acquire and do. Get a school book on natural philosophy and it will answer your second question and aid you greatly in your business.

T. W. H., of N. Y.—"If two boilers connecting by tube and stopcock, one containing atmospheric air and the other steam and water, are heated so that each one shows a heat of 200° Celsius, the one containing the atmospheric air heated, however, with valves opened for the escape of air so that *no pressure* is generated. If then at 200° Celsius the valves are closed and the stopcock is opened what will be the temperature, density, and pressure per square inch of the mixture, and what proportion of the whole space, will be occupied by the steam and what by the air, supposing the water contained in the one boiler at 6he time of opening the stopcock to have occupied one tenth of the whole space? What will be the effect of opening the stopcock upon this water, no loss or gain of heat to be supposed by exterior causes?" Air can be expanded seven volumes by heat, but if the reservoir of air in this case is left open until 200° Celsius or 390° Fah. is reached, there will be very little air left in to resist the steam in the other boiler when the communication between the two is opened—the air may as well be left out of consideration. The 390° Fah. in the steam boiler will give a pressure of 210 lbs. per square inch.

J. T. G., of Mich.—"I have a tubular boiler 60 inches by 12 feet, with 90 3-inch tubes and very large steam dome. The boiler foams considerably, and I would like to know the best way to stop it. The engine is low pressure, cylinder 22 by 24 inches, 72 strokes per minute, working at 45 lbs. pressure. What sized holes shall I put in a plate to be placed in the steam dome?" If the boiler is upright, place in the dome a capped cone of sheet metal (in form like a thimble) perforated with holes of from one eighth to one quarter inch, sufficient in number to have their combined area equal one third the area of the steam pipe that supplies the cylinder. Let this capped cone, or cylinder be small enough to have its walls at least an inch from the inner walls of the dome. If the boiler is horizontal introduce a plank of wood through the manhole and hold it by wires under the dome allowing it to float on the water surface at the low water level. Either of these will prevent foaming; but we think the boiler is insufficient for the engine if its full power is developed, and this would cause the foaming, as the rapid taking off of steam would mechanically lift the water and cause foaming.

Business and Personal.

The charge for insertion under this head is one dollar a line.

Second-hand engine lathes, and one upright, used but little, for sale cheap. Hutchinson & Laurence, 8 Dey st., New York.

We think the Lakin heat radiator is the best thing in use for coal stoves. For descriptive circular and cuts address Lakin Radiator Company, Thompsonville, Conn.

Danner's pencil case, illustrated and described on page 232, is sold at 25 cents. Upon receipt of that sum, the article will be sent to any address John Danner, Canton, Ohio.

Wanted—a good second-hand two-flue or tubular boiler, for a 30-horse engine. Send description and price to Geo. A. Shields, Columbia, S. C.

Velocipede manufacturers send circulars to box 622 Pottsville, Pa.

For terms to manufacture the best lawn mower, under exclusive license, address J. S., box 5,985, postoffice, New York.

Wanted—the address of the patentee of an engraving machine, published a few months ago. Address Engraver, postoffice box 896, Dayton, Ohio.

Wood screws.—The patentee of the screw and screw driver, page 257, this number, has an invention for making the new-shaped head of the screw.

A first-class engine should have all its appurtenances of the most approved kind. Broughton's lubricators, oil cups, and gage cocks are the best. Made by Broughton & Moore, 41 Center st.

Peck's patent drop press. For circulars, address the sole manufacturers, Milo Peck & Co., New Haven, Conn.

American Watchmaker and Jeweler. By J. Parish Stelle. Jesse Haney & Co., 119 Nassau st., New York. Price 25 cents.

For descriptive circular of the best grate bar in use, address Hutchinson & Laurence, No. 8 Dey st., New York.

Manufacturers wanted to build Ball's Ohio reapers and mowers. For terms and territory apply to J. A. Saxton, Canton, Ohio.

For sharpening all kinds of woodsaws, beyond anything heretofore known, inclose 50c., and address E. Roth, New Oxford, Pa.

Machine for picking oakum wanted. Address, with particulars about cost, etc., W. H. S., box 773, New York postoffice.

The attention of manufacturers of hardware and of metal or or wooden small wares generally, is directed to the very superior enamel or finish given to such articles by the American Enamel Co., of Providence, R. I., which, for beauty of luster and durability, is unsurpassed. For an imitation of jet or vulcanite jewelry it is just the thing. Samples on wood may be seen at the office of Landers, Frary & Clark, 31 Beekman st., N. Y., or will be furnished on application to the Co. by mail.

Millstone-dressing diamond machine, simple, effective, and durable. Also, Glazier's diamonds, diamond drills, tools for mining, and other purposes. Send stamp for circular. J. Dickinson, 64 Nassau st., N.Y.

N. C. Stiles' pat. punching and drop presses, Middletown, Ct.

For sale—the patent right, in Great Britain, for perforated saws. The manufacture of these saws is now firmly established in the United States, and they are rapidly taking the place of all other solid saws. Apply to J. E. Emerson, Trenton, N. J.

Prang's American chromos for sale at all respectable art stores. Catalogues mailed free by L. Prang & Co., Boston.

For breech-loading shot guns, address C. Parker, Meriden, Ct.

Winans' anti-incrustation powder, 11 Wall st., N. Y. 20,000 references. No foaming. No injury. 12 years in use. Imitations plenty.

NEW PUBLICATIONS.

BEECHER'S SERMONS,

Week by week as they are delivered, are now in course of publication by J. B. Ford & Co., 164 Nassau street, New York. Terms $3.50 per annum, pamphlet form.

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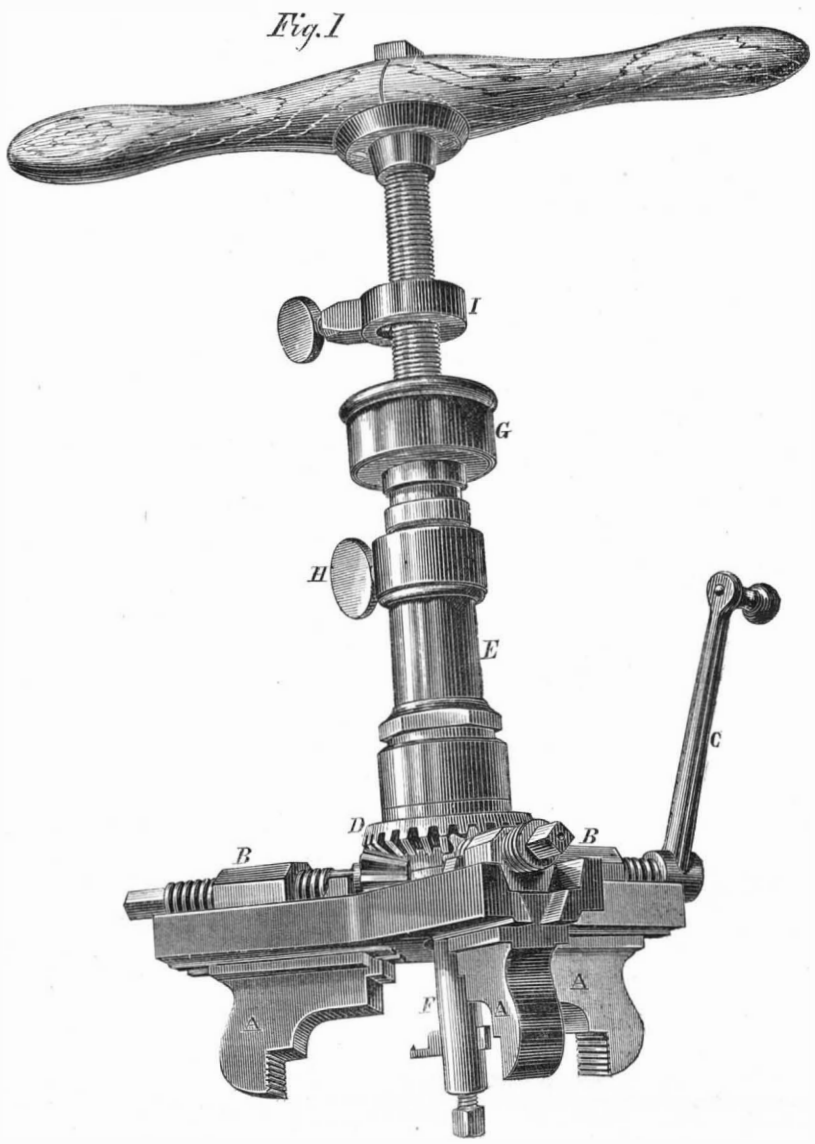
Improvement in Hand Machines for Boring Wheel Hubs.

The large engraving is a perspective view of a self-centering hub borer, which adjusts and holds the hub in position while being bored, and forms a square shoulder in the hub at the bottom of the bore. The chuck frame consists of three equidistant radial arms, having dovetailed slots in which slide the jaws, A, having corrugated grips or faces for engaging with the surface of the wheel hub, and holding it firmly. That portion of the jaw that projects above the radial arms is a nut, B, in which works a screw, the outer end of which is squared to receive a wrench, C, and the inner end carrying a beveled pinion engaging with a bevel gear turning loosely on the shank of the spider or jaw frame. By this means, whichever screw is turned, the two others, by the medium of the pinions on their ends, and the central gear, must have a common and simultaneous movement. Thus the jaws will be advanced to or receded from the center in perfect accord, and bring the center of the hub exactly coincident with the center of the machine.

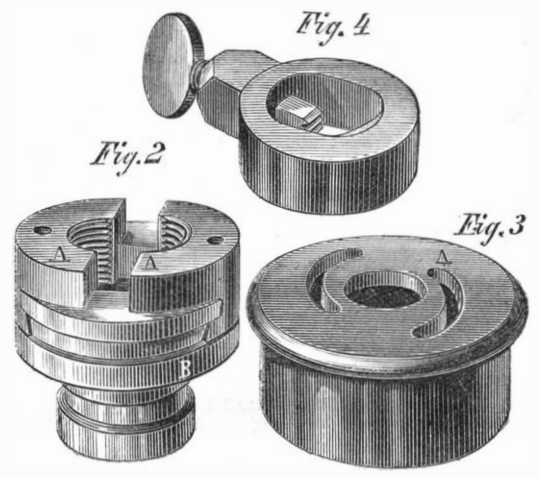


That portion of the jaw chuck above the wheel, D, is screwed to a stock, E, both being hollow to receive a boring mandrel, F, carrying a cutter at its lower end. The upper portion of this mandrel is threaded with a screw of about ten to the inch, sufficient for ordinary feed for wood cutting, and has a handle similar to that of an auger. The feed nut, G, with which the mandrel thread engages is of peculiar construction. It is seen plainly in Fig. 2. The nut is in two halves, A, which slide in a dovetail slot cut across a circular bed piece, B. The whole is covered by the cap, Fig. 3, and the half nuts are moved to or from the screw by a pin or screw in each projecting into semi-spiral slots, A, in the top of the cap. Pins on the lower portion of this cap are seated into an annular channel on the boss of B, Fig. 2, so that the cap may be turned without lifting from place. This combined nut and cap is held in place in the stock, E, when the machine is in use, by a thumb screw, H, Fig. 1, that fits in an annular groove on the shank of the circular bed piece or block, B, Fig. 2.

Fig. 4 is a gage for determining the depth of the hole to be bored; seen also at I, Fig. 1. It has an oblong hole, a portion of its interior being threaded to fit the screw of the mandrel; and on the opposite side is a gib, also threaded on its end, fitting in a chamber, and moved to place by a thumb screw. These opposite threaded portions prevent injury to the screw of the mandrel when the gage is set up.

When a hub is to be bored, the gage is secured on the mandrel at a proper hight above the cap of the feed nut, to bore the required depth of hole in the hub. The hub being held in the jaws, the mandrel is turned, the tool being fed by the feed nut at the top of the stock, E, until the gage comes in contact with the cap of the nut. The set screw, H, is then slightly loosened, which permits the feed nut to turn with the mandrel, and a few turns of the handle forms a perfectly square shoulder at the bottom of the hole. To withdraw the mandrel from the bored hub, it is only necessary to give the cap of the feed nut a slight turn to the left, separating the two halves of the nut, when the mandrel can be lifted out.

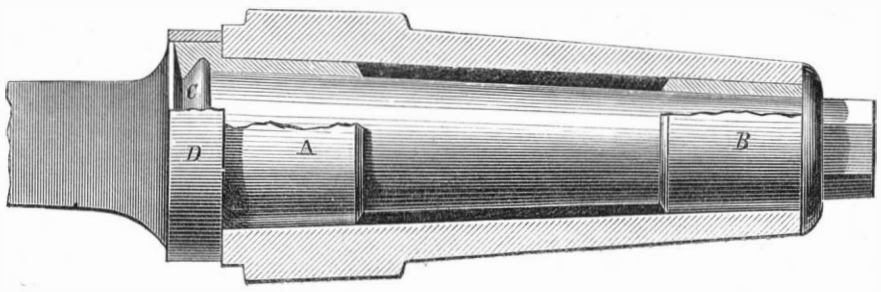
Patented August 11, 1868, antedated July 25, 1868, by A. R. Silver, assignor to himself and John Deming. Address Silver & Deming, Salem, Ohio.



SILVER'S PATENT HUB BORING MACHINE.

Improved Carriage Wheel Axle and Box.

The object of this invention is to decrease the friction of the hub, or the sleeve of the hub, on the journal of a carriage axle and at the same time to strengthen the arm at the shoulder. Instead of boring the sleeve on a taper and turning the arm to fit (always a difficult job, and never reliable when subjected to wear), two bearings, A and B, are cast on the arm. These are of anti-friction metal, Babbitt, or brass composition, forming a part of the arm and making a clean bearing for the sleeve of the hub. The coating or anti-friction metal may be secured to the arm either by scores or corrugations or held in place by a raised bead or annular ring, as at of This may be further strengthened by a ring C, wrought iron, D. In the engraving, portions are shown in section and other portions in perspective, so there can be no misunderstanding of the device. It will be seen that the necessity of turning the arm and boring the sleeve or box its whole length is dispensed with, and the work of fitting as well as the amount of friction considerably lessened. Patented through the Scientific American Patent Agency, Sept. 1, 1868, by G. S. Garth, whom address for additional particulars, at Mill Hall, Clinton Co., Pa.



GARTH'S PATENT CARRIAGE AXLE BOX.

"Do Steamers Run Above Omaha?"

What a question for the President of a New York Bank to put! Yet he so inquired of a friend of mine the other day, who is in the banking business at Omaha, and does his eastern portion of it through this same New York bank. And the moneyed man, who knows Wall street so well, and probably Liverpool and Canton, did not know, that from Omaha, steamers run up twenty-three hundred and sixty-eight miles to Fort Benton. If he had stood on the levee at Omaha the other day he would have seen the steamer *Success* come down that long run, and round to, with $300,000 in treasure.

When will eastern capitalists, and politicians, and Christians, learn where and what the West is? Some seem to think that it is the Holland Purchase, or Genesee country, or at the farthest, Ohio. Ohio is "down east" to a western man. Our ideas of the national domain are sadly dwarfish. The growth of them has by no means kept pace with our increase. The Louisiana purchase in 1803 for $15,000,000; the Florida purchase in 1819 for $3,000,000; the annexation of Texas in 1845; the California, New Mexico and Utah purchase in 1848 for $15,000,000; the Arizona purchase in 1854, for $10,000,000, and the Russian purchase for $7,500,000, were purchases that would have bought out central and southern Europe and the British Islands. A provincial eastern mind has no tolerable conception of the magnificent distances that measure and bound these regions. The banker asked an innocent question, not dreaming that an American can run between the banks of one of his own rivers more than three thousand miles on a steamer up the Missouri.

. . . . . .

Steamers above Omaha! Why, man of Wall Street, after a steamer has run three hundred and fifty miles above Omaha, on the Nebraska shore, she runs on somewhat diagonally across Dakota Territory (as large as seven Empire States, as large as forty Bay States), and then is nine hundred miles below Fort Benton, where the *Success* took on board your $300,000 in treasure.

And as vast as these distances, and territories, and steamboat excursions seem, to one going West, the idea is to be taken into an Eastern mind, if possible, that our geographical center for the national domain, is a long distance beyond the head of steamboat navigation up the Missouri, that being thirty-one hundred and seventy-five miles above St. Louis. Our present center is near the mouth of the Columbia on the Pacific, measuring from Eastport, Maine, to the extreme western Aleutian Island in our Russian purchase. If one would measure the whole, by two Titanic steps, starting from Eastport, his dividing footprint would rest somewhere about John Jacob Astor's old Astoria. Our extreme northern limit, Barrow's Point, is seventeen hundred miles farther north of this in its latitude, as well as being so much farther west. About one third of the circumference of the globe is now spanned by our territory!

When the Englishman boasted to the Indian that the sun never sets on British soil, the Indian replied; "The Great Spirit no trust Englishman in the dark." It certainly is to be hoped that our pride will not swell with our domain, or our spread eagle sprain his wings by stretching them to our two extreme limits in some national flutter.

The mileage now drawn by the delegate in Congress from Washington Territory is about $11,000 for each session; for a delegate from New Archangel it must be at least $20,000; and when one shall come down from Barrow's Point to represent in our national halls his polar bear and walrus constituency, his mileage must go vastly above a score of thousands.

I cannot compute it exactly, as Mr. Seward has not made known by what sledge path and line of kayacks, the Esquimaux delegate shall take his route to Behring's Strait, and Sitka. Lively work in politics, no doubt, the mileage and pay will make among our Esquimaux citizens, and will give us in Washington politicians more oily, if possible, than we now have there.

"Do steamers run above Omaha?" And Eastern ideas are quite as crude about the growth and population, and power of the West. Indians, log cabins, immense forests, clearings, and vast prairies, as many suppose, are the "far West," out beyond Buffalo and Chicago. They cannot realize that if all the population of New England were dropped from the census, it would not reduce it one tenth, nor can they imagine how the entire area of New England could be taken out of Minnesota, and yet leave land enough for four States and over like Connecticut.

Still fainter is the Eastern conception of the growth of the West. In the fall of 1840 I shot quails in the streets of Quincy, Ill. In April 1867, I met in the theological hall at Chicago, to whom his liberality gave the name, Dea. Willard Keyes, one of the log cabin founders of Quincy, now a populous, wealthy, and powerful city. In the spring of 1841, I spent two days at Keokuk, Iowa, a village of twelve log and two frame houses. In these it had thirteen groggeries, and a motley population of Indians, half-breeds and whites, perhaps a hundred in all. Now, Keokuk has a population of about 15,000, twelve churches, three daily papers, a medical college and two or three classical schools. Its main street is about a mile long, having many substantial brick blocks for banks, offices, hotel, etc. One railroad connects it with Des Moines, the capital, one runs around the rapids and up toward Muscatine, and one East connecting the city with leading points in Illinois.

About the same time I visited Davenport, Iowa. Then the place had a population of about six hundred, and few farms were opened beyond Duck Creek, four miles west. Now it has twenty thousand or more people, with a score of churches, splendid hotels, theaters, banking house, and private dwellings that are princely. Beyond Duck Creek now it is farms, cities and railroads four hundred miles to Council Bluffs, opposite Omaha. From Omaha the Pacific railroad is running at the rate of three miles a day, and has already gone about eight hundred miles.

Yes, steamers run above Omaha, and it would be a good thing if the heads of some of our Eastern financial and political and religious organizations would take passage on them.—*Correspondent of Congregationalist.*

THE California laurel wood is growing in favor for cabinet and ornamental manufacture. Its color is peculiar but very handsome, and it is said to take a most beautiful polish. It has a charming neutral tint which softens the glare of bright colors, and increases the depth of subdued hues.

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VOL. XIX., No. 17...[NEW SERIES]....*Twenty-third Year.*

NEW YORK, WEDNESDAY, OCTOBER 21, 1868.

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A CAUTION.

We warn our clients and inventors, generally, to pay no attention to circulars sent out by irresponsible parties, at Washington, offering to put through their cases prior to regular official action. Agents who resort to such practices, prowl about the Patent Office, and in some improper manner obtain the name and post-office address of the applicant, knowing all the while that they are violating a sacred trust, and are liable to have their names stricken from the roll of attorneys, in accordance with section 8th, of the laws of 1861. Commissioner Foote would undoubtedly exercise this prerogative, if such cases of violation were properly brought to his notice. We have now before us a case of our own. The application was duly filed, and all the fees paid. Pending the application, a firm in Washington, composed of several names unknown to the profession, sent a power of attorney to our client, who unwittingly signed it, supposing that it was necessary for him to do so.

The patent was allowed on our application, some days before the second power of attorney reached the office. Still the humbug agents took possession of the letters patent, and are demanding fees for having done nothing whatever about the case. Inventors should be very cautious about sending powers to these prowling agents.

CHANGES IN THE ELEVATION OF LAND.---SUBSIDENCE OF COASTS.

OUR attention has been attracted to this subject by an article that recently appeared in the New York *Times* giving some statements in regard to evidences of a gradual subsidence of the New Jersey coast, especially the lower section of the State. Speaking of the facts which seem to sustain the idea that for many years there has been a gradual sinking of the land the writer says:

"One of the most marked of these is the diminution of efficiency in various mills located in or near the tide waters. The owner of a tide-mill near Beeseley's Point, in Cape May County, has attended this mill himself since 1826, and during all the intervening time there has been no change in the raceways or the arrangement of the wheel. He is positive that he has lost four inches of head, if not more, by the increased height of low water.

"A pond-mill on West Creek, built in 1805, with its wheel-pit floor carefully set as low as possible so as not to be affected by the tide, which flows up to it, and which has not since been altered, was only affected during extraordinary high tides, produced by storms. Now it is stopped twenty times a year by common perigee tides; and a careful observer in the neighborhood believes that the tide rises twelve if not fifteen inches higher on the wheel than when the mill was first built.

"A saw-mill on Sluice Creek, built in 1757, was originally beyond the reach of its usual height of the tide, when at present the high tides reach half way up the mill-dam, and the mill is only run by having a dam and sluice some distance below. The owner thinks the tides rise an average of two feet higher than when the mill was first erected. These facts show that there has been a perceptible change in the relative level of the land and water within the memory of men now living."

It is to be noticed that these cases are not to be counted among those where the wash of the surface has undermined the land and swept the earth away; only the peaceful action of the tide could have abraded the land. But it would seem that a gradual sinking of the land, or as gradual an uprising of the sea level must have produced these results. The former appears to be the most probable hypothesis, as in the latter case the effect would have been general rather than local. These facts show that the forces which in former ages produced those changes, the results of which even now excite our wonder, are still in operation, although, perhaps, in a limited degree. A remarkable evidence of the change in the relative level of land and sea is afforded on the shore of the Bay of Fundy, a few miles north of Yarmouth, Nova Scotia. Here, at a distance of at least a quarter of a mile from the beach, are the distinct water marks of a former sea level. A line runs along the face of the ledge, well defined, and below its level minute sea shells, and even petrified kelp we have found in the interstices of the rock. Now the limit of the waters of the bay, even at the highest tides, is distant from the ancient sea level at least twelve hundred feet, which is a gradually shelving plateau of sand, shells, gravel, and stones, unproductive of any vegetation exeept a few patches of sedges. The absence of soil would seem to denote that the change in land level here was comparatively modern, and the beach and land intervening between the present and former water line, being composed of the same materials as the sea bottom, seems to indicate that the bottom has been exposed either by its rising or the subsidence of the water.

We remember, when a boy, fishing in a little estuary of Narragansett Bay under the shadow of a grove, the trees of which grew within a few feet of the high tide line, so near that when landing, the boat's "painter," some fifteen feet long, was usually tied to one of the trees. When last there, the water line had receded from the trees about fifteen feet on a shelving shore, the relative level of sea and land having changed at least twenty inches in about as many years. Curious to know the reason, and believing the wash of the rains had gradually filled the bed of the estuary, we tested the matter by a simple experiment. There was a flat submerged rock, about forty feet from the shore, on which, at high tide, there was about four feet of water. Now there was, at the same state of the tide in the same month of the year, by measurement, only twenty-eight inches of water on the rock. No accumulation of sand washings could have produced this result; the bottom of the estuary had risen or been lifted up twenty inches in twenty years.

The changes made by the washing of the surf in gradually undermining and encroaching upon the land are noticeable on almost all exposed shores unless guarded by cliffs of stone. Many of our seaside watering places give marked evidences of such encroachments. Summer seats which a few years ago possessed fruitful gardens or verdant lawns sloping toward the water, have lost these pleasant appendages, and in some cases the sites of the houses have been threatened, if not made dangerous, by these encroachments. The writer from whom we have quoted says, further, in relation to these encroachments on the coast of New Jersey: This wearing effect of the waves is especially visible in the Southern part of this State. On the Atlantic shore of Cape May County sand-banks from fifteen to thirty feet high, and many of them covered with living trees, have been washed away, and their places supplied by flat and sloping sands. In some sections they wear away more rapidly than in others. Dr. Leaming and other residents of the vicinity think that the Seven Mile Beach opposite Seavile has worn away one hundred yards during the past twenty years.

The shore in front of the boarding-house at Cape Island must have worn away nearly a mile since the Revolutionary War. This is the opinion of Mr. Ezekiel Stephens, whose father resided upon the spot. During the Revolution a militia artillery company used to practice firing at this point. Their gun was stationed near a house which stood just beyond the present shore line, and their target was full three-quarters of a mile east. Beyond this beaches extended for nearly a quarter of a mile before reaching the sea-shore. The sea has washed away the whole of this ground, and one of the boarding-houses has been removed twice to escape being swept away. Within a few years the bank has been protected by a covering of cedar brush, and the wear has not been so perceptible.

A remarkable evidence of the wearing of the bay shore of the county is related. The grandmother of Aaron Leaming was buried in 1794, at Townbank, in a graveyard some distance inside of the town. In 1734, the graves were about fifty rods from the shore, and ruins of the houses were apparent. Now the graveyard has all been washed away, and at dead low-water mark, the mark of three wells, remnants of the town built between the shore and the graveyard, can be seen. Mr. Price, a surveyor in the vicinity says his lines are shorter by forty or fifty rods, than they were in 1776.

Dennis Creek is said to have lost more than a mile of its length by the wearing away of the marsh at its mouth, within the last seventy years. A single storm will sometimes wash away several rods of the marsh. In 1852, a human body which had washed ashore, was buried forty rods from the shore, near the mouth of Dennis Creek. Three years after the shore was found washed away quite up to the coffin, which was exposed. Mr. Smith, a surveyor, believes that the shore for three-fourths of a mile in breadth has been washed away the whole distance between West and Dennis Creeks in Cape May. Similar facts are attested respecting the shores of the Delaware Bay and River in Salem and Cumberland Counties.

THE pictorial publications have illustrations of the recent earthquake of course "taken on the spot." A friend of ours who has seen the real thing several times, says the artists' hands appear to have been altogether *too steady.*

WELDING---NATURE AND MEANS OF THE PROCESS.

Welding, as usually considered, is the uniting of two pieces of iron or steel by the combined means of heating and compression, or by either of these alone. In the welding of wrought iron the two portions to be united are brought to a white or welding heat—a state of incipient fusion—in a furnace or forge, and then united by being brought in contact, and subjected to percussion by the hammer, or to compression by rollers or dies. This is the usual style of welding.

Welding, by heating alone, is used in repairing broken castings of iron, and also for uniting cast steel and cast iron, as the faces of anvils united to a cast iron block, or the edges of shears and scissors to the iron stock. It is performed, in the first instance, by placing the mass of cast iron in a mold with a cavity formed by the broken piece, used as a pattern, and then replaced, a free gate being made from the point of fracture or intended union. The melted iron is poured in and allowed to flow through, until, in the judgment of the operator, the two surfaces are brought to such a state of fusion as will suffice to unite the parts when the gate is closed, and the iron allowed to rise in the sprew. The method of uniting cast steel and cast iron is similar, and the results are the same.

Welding, by compression alone, is, so far as we know, the result of accident, although why it might not be utilized we cannot see. It may be witnessed sometimes in the case of turbine water wheels, or other heavy machinery supported on upright shafts, the weight of which is sustained by two or more washers of steel or iron. The weight, combined with the friction, unites the disks so firmly that we have seen cases where they could not be separated by any ordinary mechanical means.

The object of heating is to soften the substance, or rather to separate its particles, thus allowing room for the reception of the particles of the other piece to be joined. In fact, it is a partial fusion of the metals, which forms a union of their particles in the same way as in melting and casting, except in the former case compression is necessary to complete the work. Although we speak of percussion, rolling, and pressing, as comprehended under the general term of compression, one method may have a great advantage over another under certain circumstances. For instance, we examined, the other day, a steel bit for a horse's mouth, having a large steel ring at each end made of quarter inch steel wire. It was impossible to see where these rings were welded, although the weld was only a but or jump weld—the parts in contact being only the cross section or diameter of the wire—and the only means of hiding the joint was the finish received by the rattle box or tumbling barrel. The method used was to coil the wire on a shaft of suitable size, as in winding a close coiled spring, and then sawing longitudinally across, separating each coil into a ring. This was passed through the hole in the head of the bit, and the ends of the ring heated to a low red only. Then the ring and bit head was laid into a recess in the matrix or stationary die of a press, which was slightly smaller in diameter than the unfinished ring, and a corresponding die was brought down upon the ring, not dropped, but with a gradual squeeze. With only this slight heat, but with the compression, extending around and exerting its force on every portion of the ring, the result was perfection itself. This style of work is done by some concern in New Haven, Conn., the name of which has escaped our recollection. It would seem that this process might be economically applied to the manufacture of chains, elegant in appearance and of unusual strength. It appears that the union of the parts in a weld is effected more by the compression of the parts than by the heating. Blacksmiths understand this when they require the blows of two or more sledges to make a weld. It may be mentioned that clean surfaces are necessary, as the least amount of oxidation impairs the efficiency of the weld. The use of a flux, as borax or sand, etc., is mainly to protect the parts from the oxygen of the atmosphere.

HORACE GREELEY'S RECOLLECTIONS OF A BUSY LIFE.

This book is a reproduction of a series of autobiographical papers published in the New York *Ledger*. We presume nothing of the kind ever published in this country has been more extensively read than these papers. The book before us has, however, important additions of miscellanies from the pen of its gifted author, and the celebrated discussion of the law of divorce by Mr. Greeley and the Hon. Robert Dale Owen, as it appeared in the *Tribune* during the spring of 1860.

The lives of distinguished men have always been considered as profitable studies, and when written by themselves they are specially so. All men have their faults and weaknesses, and though self-knowledge is ever earnestly sought by all really great men, none ever attain to such perfection that some defects, some unvanquished tendencies do not remain. Such faults of character, apt to be glozed over by biographers, display themselves when a man attempts to tell his own story. We have read Parton's "Life of Horace Greeley," and while we admire the singularly felicitous style which has made Mr Parton so justly popular as an author, we still think no better illustration of the superior value of well written autobiography could be given than is obtained by a comparison of his book with that of Mr. Greeley. Autobiography is necessarily tinged with egotism; nevertheless there is always a piquancy in personal narrations which is lost when they come at second hand. These "Recollections" have the full flavor of Mr. Greeley's personality; after a perusal one feels like an old acquaintance.

We have never been a believer in the infallibility of Mr. Greeley's judgment or philosophy; but we do believe in his earnestness, his honesty, his power, and if no other lesson

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could be learned from a perusal of the story of his life than the value of these most essential qualifications for highest success, it would a thousand times repay perusal. Casually opening the volume, almost the first thing which catches our eye is the story of the author's first attempt at smoking. "A number of half smoked cigars had been left on the mantel, and some evil genius suggested to us tow-headed urchins that it would be smart and clever to indulge in a general smoke. Like older fools, we went in, and I was soon the sickest mortal on the face of this planet. I cannot say as to my comrades in this folly; but that half-inch of cigar stump will last me all my life, though its years should outnumber Methuselah's. * * * * * From that hour to this, the chewing, smoking, or snuffing of tobacco has seemed to me, if not the most pernicious, certainly the vilest, most detestable abuse of his corrupted sensual appetites whereof depraved man is capable."

This incident, and the language in which it is told, are characteristic of the man. His convictions are never halfway, and for that reason his language is strong. It is born of earnestness, the parent of strength in all things. Horace Greeley is a strong man every way; strong in his likes and dislikes, in his opinions and prejudices. Mentally and physically his powers of endurance are such as to excite the admiration of all who know the amount of work he daily gets through. As a self-educated, self-made man, he ranks with Franklin, although the two men differ widely in some respects. Their tastes exhibit many points of contrast, while their habits of life and general views of affairs have many resemblances. Greeley is a philanthropist, and a genial kind-hearted man, who yet has the nerve to apply the scourge to any one whom he esteems a willful wrong-doer. His pen is a lash of scorpions, when his ire is aroused. As a vigorous, caustic, and humorous writer, he has not his equal on the American press. His humor is of the quiet sort, the most effective of all styles. Take this example from his description of a night ride of forty-three miles on a hand car over a Western railroad: "I only tried my hand at propelling for one short mile, and that experience sufficed to convince me that, however it may be as a business, this species of exercise cannot be conscientiously commended as an amusement." Or this: "I presume if I ever were to have the week I covet I should find it insufferably tedious—the musketoes biting superbly; the trout shyly, or not at all—and should long for a return to civilization, with its hourly toils and struggles, its thronged pavements, and its damp newspapers with breakfast." Or this: "I conceive it all but an axiom, that he who asks a stranger to lend him money will never pay it; yet I have known an exception. Once, when I was exceedingly poor and needy, in a season of commercial revulsion, or 'panic,' I opened a letter from Utica, and found therein five dollars, which the writer asked me to receive in satisfaction of a loan of that sum which I had made him—a needy stranger—on an occasion which he recalled to my remembrance. Perplexed by so unusual a message, and especially by receiving it at such a time when every one else was seeking to borrow—no one condescending to pay—I scanned the letter more closely, and at length achieved a solution of the problem. The writer was a patient in the State lunatic asylum."

The book is interspersed with just such gems of humor, as these we have quoted, from each of which a lesson of instruction as well as a hearty laugh may be obtained. As a moral tonic we have seldom seen a book that we would more readily place in the hands of a family, or one that we should expect to see sooner well thumbed.

J. B. Ford & Co., Printing House Square, New York, 1688.

Photographing the Sun during the Total Eclipse.

The *Augsburg Gazette*, of September 13, contains the following extract from a letter written by Dr. Hermann Vogel, who accompanied the North German expedition to Aden, as a photographer:

"At four o' clock, on the 18th of August, we left Aden, where the expedition had established its head-quarters. Nine-tenths of the sky was overcast, and we endeavored to feel as resigned as possible to our probable disappointment. Our object was to obtain as many photographs as could be taken of the phenomena during the three minutes they would last, and in order to do this we had practiced with our machine, like soldiers with fire-arms. Dr. Frische was charged with the preparation of the plates, Dr. Zenker with putting the slides into the machine, Dr. Therle with drawing them out when they had been exposed a sufficient time, while my business was in the tent. With this division of labor we found that it would be possible to obtain six photographs in the three minutes. As the important moment approached, to our delight we saw, through a break in the clouds, the disk of the sun partially covered by the moon. The landscape around us assumed a strange hue, neither sunlight nor moonlight—the chemical color rays were exceedingly weak. As a test, we exposed a plate in the machine for fifteen seconds, and obtained a good impression of the clouds; as the disk of the sun grew smaller, the clouds opened out. The last minute before the total eclipse arrived, Dr. Frische and I crept into our tent—our work began. The first plate was experimentally exposed five and ten seconds, in order to be sure of the right time. Mahommed, our black servant, brought me the first slide into the tent. I prepared the plate, and anxiously watched to see what would appear. Just then my light went out. I rushed out of the tent with the plate in my hand, and came back with a small oil lamp, which, in case of accidents, I had placed on a table outside. Eagerly I gazed on the plate—the dark border of the sun was surrounded on one side by peculiar protuberances, and on the other was a re-remarkable horn. The phenomena were the same in both pictures. My joy was great, but I had no time to indulge in it. The second plate, and, a moment afterwards, the third plate, were brought into the tent. Dr. Zenker shouted to us that the sun was reappearing. The total eclipse was over. The last two plates only showed slight impressions of pictures, as they had been spoilt by the clouds, which, while they were exposed in the machine, had closed in. The three plates showed protuberances on the lower border. We washed, fixed, and lacquered our plates, and took several copies of them on glass, which will be sent separately to Europe in order to insure their safe arrival."

Total Eclipse in 1869.

Asia it seems is not to enjoy a monopoly of total solar eclipses. It is announced that a total eclipse of the sun, visible in the United States, will occur in 1869. The sun will rise eclipsed in the interior of Siberia, on the morning of August 7, 1869, whence the shadow will move in a northeasterly direction; then, turning eastwardly and southwestwardly, will pass over Behring's straits and northern Alaska at noon, local time. Thence, moving across part of British North America, it will re-enter the United States in Montana, between 2 and 3 p. m., local time. Moving thence across Western Nebraska, it will pass diagonally through Iowa, passing over Sioux City, Des Moines, and Keokuk, about 5 o'clock. Thence it will pass still to the southeast, over Jacksonville, Illinois, across Southern Indiana, Central Kentucky, Eastern Tennessee, into and across North Carolina, and will touch the sea coast in Pamlico sound; and will finally leave the earth not far from the Bermudas. It will be visible in all parts of the United States, and total over a belt about 100 miles wide along the line just indicated, the sun being hid more than four minutes.

Editorial Summary.

Cigar Making by Machinery.—The Bright's American Cigar Machine, patented through the Scientific American Patent Agency, was exhibited a few days ago at 171 Broadway, New York City, to members of the press and experts On an examination of the machine (or machines, for there are several) and the operations, we must confess we were favorably impressed with the feasibility of producing good cigars, of equable smoking properties, by means of these machines, which resemble in size, portability, and finish the ordinary sewing machine. The rapidity of the processes, and the perfection of the result seem to promise an early and general introduction of the process and the machines, which may be driven by foot, hand, or steam power. Manufacturers of cigars or chewing and smoking tobacco would do well to examine this machinery.

Hindoo Writing.—Writing is a curious art as practiced by the Hindoos. They may be often seen walking along their native streets writing a letter. An iron stile and a palm leaf are the implements. In writing neither chair nor table is needed, the leaf being supported on the middle finger of the left hand and kept steady with the thumb and forefinger. The right hand does not, as with us, move along the surface, but, after finising a few words, the writer fixes the point of the iron in the last letter, and pushes the leaf from right to left, so that he may finish the line. The characters are rendered legible by besmearing the leaf with ink like fluid. A letter is generally finished on a single leaf, which is then envolved in a second, whereupon is the address.

Joseph not a Carpenter.—The *Builder* says: "When the British Archæological Association were inspecting the gallery of the paintings at Charlton House, attention being called to the picture of Joseph working as a carpenter, assisted by the child Jesus, Mr. Black said he wished that Joseph had been represented in his proper business as a mason, the original term used signifying architect, builder, or mason, and not carpenter. The term carpenter, he urged, was undoubtedly an error, as in the climes where Joseph dwelt no wood was used in the erection of the structure of their houses but stone only."

Sale of Prof. Silliman's Mineralogical Cabinet.—We learn that the Executive Committee of the Board of Trustees of Cornell University have purchased the private mineralogical cabinet of Prof. Silliman, of Yale College. Prof. Silliman says of the cabinet, "My collection has been formed almost exclusively by my own personal exertions, during more than twenty years of active experience as a collector in the field, and by the system of exchanges instituted from an early day with the most active collectors both in America and Europe."

New Dye for Woolen Goods.—Tar water, it is asserted, may be employed for dyeing silk and wool with the color called *gris cendre*, or ash gray. The stuff is first mordanted with weak perchloride of iron, by soaking in the solution for some hours. It is then drained and passed through the bath of tar water. The oxyphenate of iron, which is thus precipitated on the fabric, gives a very solid color

The North Star Gold Mine of Grass Valley, Cal., are exhibiting at the Mechanic's Fair some specimens of ore which are valuable as showing stratification in veins, thereby proving the impossibility of volcanic ejection in the filling up of those veins with quartz, pyrites, and gold.

The New York *Times* does not give us credit for the article upon "Solar Engines," which first appeared in the Scientific American, Sept. 16th. The translation was furnished to us by Mr. Delamater, and is the same in the *Times*, word for word, as it appeared in our columns.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING OCTOBER 6, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

82,673.—Sheep-shearing Device.—J. K. Alwood, Delta, Ohio.

1 claim, 1st, The bladed wheel, a a a, with its blades, K K K K, substantially as described, for the purpose specified.

2d, The semicircular protuberance, P, of the shear case, S, in front of the dotted line, d, with the fingers, v v, substantially as described, for the purpose specified.

3d, The combination or connection of the bladed wheel, a a a, with the cord wheel, Y, so as to receive motion therefrom.

4th, The combination of the several parts described, for the purpose of forming a cutting device for sheep shearing

82,674.—Mode of Transmitting Motion.—Marcus M. Ammidown, Boston Mass.

1 claim, 1st, The combination of the hub, a, and the cylindrical shell, d, provided with the eccentric, d', substantially as and for the purpose set forth.

2d, The combination, with the eccentric, d', of the pawl, e, and toothed wheel, f, substantially as and for the purpose specified.

82,675.—Axle Grease.—J. J Barrett, Chillicothe, Ohio.

I claim the axle grease compounded substantially as above described.

82,676.—Nozzle for Hose Pipe.—Oscar J. Backus, San Francisco, Cal.

I claim the combination, with a nozzle, throwing a single stream of water, the sprinkler, D, constructed and operated with the holes, E F G G, in the stop cock, and holes, C C, leading into the nozzle chamber, substantially as and for the purpose specified.

82,677.—Sadiron Handle.—Arad Barrows, Philadelphia, Pa.

I claim the cast sadiron handle, A, including the wires or rods, C C, constructed and arranged substantially as described, as a new article of manufacture.

82,678.—Slat Matting for Cars, etc.—William Barton, Troy, N Y.

I claim a flexible slat matting, consisting of the slats, A, and flexible lines, B, the knots or protuberances for keeping the slats apart being formed by the said lines, B, as set forth.

82,679.—Nail-Cutting Machine.—W. H. Battelle, Youngstown, Ohio

I claim, 1st, The arrangement of sliding nipper bar, A, provided with the spring nipper, F, the spring, C, cam, E, adjusting pin, e, and retractor, C' substantially as and for the purpose set forth.

2d, The arrangement, with the feeding guide, N, of the slide, U, rod, T, weight V, pulleys, X Y, rod, P, and cord, W, all substantially as and for the purpose set forth.

3d, The arrangement, upon the carriers, H, of the headers, G, enlargements I, set screws, M, and detachable brackets, K, substantially as described for the purpose specified.

82,680.—Axle Head.—R. E. Bean, Franklin, N. H.

I claim, 1st, An axle, with a projecting cross bar, in combination with a head, the latter having an opening in its inner face corresponding with the cross-bar, and also a spring plate, provided with a depression or boss, by which latter means the cross bar is prevented from turning when once secured in place.

2d, The head, C, plate, c, constructed as shown, projection, c4, spring, c1, rod, c2, and button, c3, in combination with collar, B, with opening, b, as and for the purpose described.

3d, The head, C, constructed as described, in combination with the projection, a, of axle, A, substantially as and for the purpose explained.

82,681.—Hasp Lock.—J. H. Beauregard Kingsbury, N. Y.

1 claim, 1st, The locking circle, constructed with the internal cog, V, and the tooth, W, in combination with bolt, A, and lever, L, substantially as and for the purpose described.

2d, The bolt, A, fastened substantially as described, and provided with the ears or stops, O P, as and for the purposes substantially as described.

3d, The pivoted engaging lever, L, with tooth, l, in combination with the locking circle, D, pin, M, and bolt, A, substantially as and for the purpose described.

82,682.—Apparatus for Defecating Cane Juice.—H. B. Bond, Houma, La.

I claim, 1st, The closed cistern, A, provided with the removable manhead and the stuffing boxes, constructed and operating substantially as and for the purpose set forth.

2d, The combination, with the cistern, A, of the agitator herein described when the latter is constructed substantially as set forth, and is provided with vanes, or the equivalent thereof, arranged in such manner as to produce a pressure or packing of the gas inside the cistern, substantially as described.

3d, The pipe, G, made removable and adjustable, as described, in such manner that it can be used for discharging the juice on either side of the cistern, A, as set forth.

4th, Perforating the strainer or diaphragm, N, with holes that expand as they pass to the under surface of the same, for the purpose set forth.

5th, The sliding gate or fender, V, when constructed and operating as described and for the purpose set forth.

6th, The combination of the juice-receiver, M, when provided with the perforated strainer, N, and sliding gate or fender, V, with the cistern A, and its component parts, substantially in the manner and for the purpose set forth.

82,683.—Children's Carriage.—Francis Boylston, New York city.

I claim the brackets, C C, having extensions, b b, bolted to the ends of the sills, B, and provided with an internal screw thread into which the ends of the front axle are firmly screwed, as herein set forth for the purpose specified.

82,684.—Temple for Loom.—Lucius Briggs (assignor to himself and George Buntin), Grosvenor Dale, Conn.

I claim, in a roller temple, the center pin, as extended beyond the trough head, as set forth, and provided with passages leading into the extension, and through the pin, substantially as and for the purpose specified.

Also, in a roller temple, the center pin, as made with an oiling passage made through it lengthwise, and opening out of the side of the pin.

82,685.—Straw Cutter.—Joseph W. Brockway, New York city.

I claim, 1st, The cutter, n, and stock m, in combination with the handle, r, applied directly to such cutter or stock so that the same can be vibrated by hand, and swing in contact with the bars, o o, at the end of the feeding trough substantially as set forth.

2d, The arrangement of gearing, h d d' k and l, in combination with the feed rollers, c c, cutter stock, m, and cutters, n, as and for the purposes set forth.

82,686.—Mold for Making Acupuncture Instruments.—A. R. Brown, M.D., Albion, Mich.

I claim the former, F, having slits or mortises cast through it, as described, to receive the blades of puncturing lancets, 1 2 3, e c., in combination with a mold for casting the plungers, E B, substantially as and for the purpose specified.

82,687.—Spring Bed Bottom.—George A. Brown, Kalamazoo, Mich.

I claim the application of spiral springs, M M, combined with cords, R R, and their attachment, P P, and pulleys, K I, and pins, N N, when constructed and arranged substantially as herein set forth and described.

82,688.—Mode of Securing Horse-power to the Ground.—W. H. Buell, Union City, Mich.

I claim, in combination with each other, and with a horse power frame, the stays, C, rods, D, and stakes, S, when said parts are arranged relatively with each other, and with said frame, and constructed and connected substantially as and for the purpose specified.

82,689.—Truss.—John Burnham, Batavia, Ill.

I claim the attaching of the pad lever, C, of the truss to the spring, in the band or strap thereof, by means of a ball-and-socket joint, substantially as shown and described.

82,690.—Carriage Wheel.—J. G Buzzell, Lynn, Mass., assignor to himself and Charles Cummings, Hollis, Me.

I claim, in the carriage wheel, consisting of the hub, A, having the chambers, a a, and the caps, B B, of the spokes, C C, bent in the manner specified, the springs, E, inserted in the felly, D, all arranged and operating substantially as herein shown and described.

82,691.—Towel and Clothes Rack.—Chauncey Carrier, Columbus, N Y

I claim the graduated cups, B B, provided with lugs, a a, to form a seat for the end of the bar, and so arranged that the bottom of each cup, except the lowest, may fit into and turn in the top of the one next below it, substantially as described.

82,692.—Mortising Machine.—Charles Carter, Auburn, N. Y.

I claim, 1st, The tool-carrying slide, G G, guides, H H, and spreading wedge J, combined and adapted for lateral adjustment of the tools, g, substantially as described.

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2d, The combination, with the tilting table, of the right and left screws, S' and wheels, s s t, arranged for operating both screws in same direction, and thereby operate clamps, R R, suostantially as described.

3d, The adjustable stop, Z, in combination with the rack and pinion, i j, wedge, J, and spreading-tool slide, and guides, G H, substantially as and for the purpose described.

4th, The combination and arrangement of the spreading head or slide, G H, wedge, J, rack and pinion, i j, stop, Z table, L, clamp, R, and saw, U, all constructed and operating substantially as and for the purpose described.

82,693.—CHIMNEY CAP.—Wm Chappell, Buffalo, N. Y.

I claim the arrangement of the wheel, D, over the mouth of a flue or chimney, when made in diameter larger than the outlet, and provided with overlapping spiral vanes, E E, so as to protect the mouth of the flue, as herein set forth.

82,694.—PADLOCK.—G. W Dana, Racine, Wis.

I claim the two bolts, C C, halved or recessed at one end, and lapped, one over the other, and beveled at their outer edges, in connection with the bent levers, D D', plate, E, and spring, F, all arranged substantially as and for the purpose set forth.

82,695.—TELEGRAPHIC INSTRUMENT.—S. F. Day, Balston Spa, N. Y.

I claim, 1st, The combination of a relay and sounder, and the resistance coil, O or its equivalent, substantially as and to the effect hereinbefore set forth.

2d, The arrangement of parts herein described, or its equivalent, by which the sounder, while controlled by the relay, is also made to work the main line as a repeater, substantially as herein set forth.

3d, The comoination of the magnets, D D, shafts, Q Q, clamping pieces, S and T, and adjusting screw, U, or their equivalent, substantially as set forth.

82,696.—LINIMENT FOR RHEUMATISM.—A. M. Dennen, Folsom City, Cal.

I claim the medical compound, substantially as herein described.

82,697.—SCREW PLATE.—J. S. Dutton, Jaffrey, N. H.

I claim, in combination with a screw-die plate and screw handle, C, the indexed collar, a, and the indexed shoulders, b and f, arranged substantially as described.

82,698.—MILK VAT.—J. A. Edwards, Waterford, Pa.

I claim the described arrangement, within the milk vat, of the agitators, C C, lever, D, bulkhead, F, gate, G, and furnace, B, as herein described for the purpose specified.

82,699.—CUTTER HEAD.—W. G. Farmer, Burlington, Vt.

I claim the circular grooved plate, A, provided with a collar, B, and movable grooved plate, E, in combination with the knives, D D and H H, all constructed as described and operating substantially as and for the purposes herein set forth.

82,700.—FLOOR CLAMP.—J. H Ferreira, Newark, N. J.

I claim the combination, in a clamping device, of cam, G, plunger, D, spring, E, and shackle, C, pins, H, operating substantially as and for the purpose described.

82,701.—BRAKE FOR SEWING MACHINE.—James S. Fowler, Racine, Wis.

I claim, 1st, The arrangement of the spring, F, the pivoted box or holder, E, and rubber block, D, with the table and fly wheel, as herein shown and described and for the purpose set forth.

2d, The combination of the sliding rod, G, with the pivoted box or holder, E, and rubber block, D, substantially as herein shown and described and for the purpose set forth.

27,702.—ABDOMINAL SUPPORTER.—Joseph Funkhouser Rockingham county, Va.

I claim the iron padded brace or support, A B C, the sack, E, the bands, and the manner of attaching the same, substantially as and for the purposes above described, using therefor the metal and material aforesaid, or any other substantially the same.

82,703.—SHAFT COUPLING.—J. P. Gates, Lincoln, Ill.

I claim, 1st, The disks, D and C, secured to proper shafts, with the slide or shuttle key, E, in relation to the channels, S and J, and recess, Q, or their equivalents, when constructed and operating substantially as and for the purposes set forth.

2d, The disk, C, having its shaft, K, protruding inwardly, in combination with the disk, D, having an opening in its inner face, which opening forms a bearing for shaft, K, substantially as and for the purposes set forth.

3d, The shuttle key or slide, E, with its studs, F and G, or their equivalents, for the purposes shown.

4th, The spring, N, in connection with the oscillating stud, O, and slide, E, or their equivalents, when operating substantially for the purposes set forth.

5th, The cam, L, with its semi-annular channel, J, arm, I, lever, V, head U, or their equivalents, when arranged and operating substantially as and for the purposes shown.

6th, The combination of all the above-mentioned parts and their attachments when constructed, arranged, and operating substantially as and for the purposes herein set forth and described.

82,704.—BARBERS' CHAIR.—Albert Gerdes and Julius Reiche, New York city.

We claim, 1st, A barber's chair, whose seat, back, and head rest are upholstered on both sides, the same being so connected by such mechanism that that the said seat, back, and head rest may be reversed simultaneously, in the manner and for the purpose substantially as herein shown and described.

2d, The split tube and taper ferrule, r, for the purpose of adjusting and holding the head rest, substantially as shown and described.

82,705.—SCRUBBING BRUSH.—S. Gibson, Safe Harbor, Pa.

I claim the arrangement of the shouldered plate, A, and flanged keeper, E, inclosing the strips of rubber, D, upon the forward part of the bristle brush, G, all as herein shown and described.

82,706.—SLEIGH.—E. H. Gillman, Montpelier, Vt.

I claim the draw rods, D D, for sleighs, for the purposes and in the manner and form set forth.

82,707.—CAR COUPLING.—H. C. Glasgow, Cleveland, Ohio.

I claim, 1st, The quadrangular metallic box, B, divided into two or more spaces by the horizontal partitions, g, and provided with flanges, e e, to which the bent bars, f f, are pivoted, embracing the chafing timbers, c c, whereby the box is held between and guided upon said timbers, as herein shown and and described.

2d, The coupling box, B, with or without the block, C, in combination with the block, D, follower, E, links, i and k, spring, F, and stop, l or m, all made and operating substantially as and for the purpose herein shown and described.

3d, So arranging the top and bottom plates, n and o, of a coupling box, by perforating the same, that the coupling link can be inserted from the rear, substantially as herein shown and described.

82,708.—CAR COUPLING.—H C. Glasgow, Cleveland, Ohio.

I claim, 1st, The arrangement of the floor beams, A' A', when they project through a sill, B, constructed to receive them, and serve as bumpers and to carry the sliding coupling box, substantially as herein shown and described.

2d, The manner herein shown and described of fastening the two ends of each U-shaped draft bar, e, to the coupling box by means of one pin, f, substantially as herein shown and described.

3d, The arrangement and combination with each other of the coupling box, G, block, I, spring, g, transom, b spring, H, and draft bars, e, all made and operating substantially as and for the purpose herein shown and described.

82,709.—TRACE BUCKLE.—William W. Gordon and Dexter Pettengill, Delhi, N. Y.

We claim the combination and peculiar arrangement of the frame, A, tongue plate, C, and tug strap, E, in the manner and for the purposes set forth in the above specifications

82,710.—DOUGH MIXER.—Francois Grenior, Beroserac, France, assignor to G. H. Mercer and A. S. Monod, New York city.

I claim, 1st, The rotating spiral blades, J J, and the rotating bearers, H H, arranged in pairs, each pair having a bottom scraper, b, in combination with the frame, A, substantially as described for the purpose specified.

2d, The dough-mixing machine, consisting of the rotating annular trough, C, rotating beaters, H H, rotating screws, J J, and fixed scrapers, I I, all made and operating substantially as herein shown and described.

82,711.—MANUFACTURE OF EDGE TOOLS.—Reuben C. Grover, Newton, Mass.

I claim the knife, A b, constructed as described, and as a new article of manufacture.

82,712.—APPARATUS FOR THE MANUFACTURE OF VINEGAR.—Theodore Grundmann, Cleveland, Ohio.

I claim, 1st, The braided strands, D D, when used in a vinegar apparatus, for spreading the mash and exposing it to the air, as set forth.

2d, The self-regulating swinging mash-distributing box, G, arranged substantially as herein shown and describe.

3d, The box, A, when composed of a series of detachable plates, as set forth, so that the suspended braids, D, may be exposed to the air to be dried.

4th, A vinegar apparatus, consisting of the box, A, vessel, B, frame, C, braided pendants, D, distributing box, G, and supply and discharge pipes, I and J, all made and operating substantially as herein shown and described.

5th, The device set forth in the foregoing clause, in combination with the filter, H, in which the two perforated plates, l and m, are arranged, as set forth.

6th, The distributing-sheet, E, arranged between the swinging box, G, and the braided pendants, D, substantially as herein shown and described.

82,713.—WASH BOILER.—J. A. Hammer and Thomas Chadwick, Newton, Iowa.

We claim, 1st, A clothes washer, so constructed as to form one lower or boiling chamber, one clothes chamber, and one or more reservoirs for supplying clean hot water, substantially as herein set forth.

2d, A clothes washer, constructed as described, with one or more reservoirs, connected by valves to the boiling chamber below, which valves can be opened and closed at will from the top of the boiler, substantially as and for the purposes herein set forth.

3d, Passing the steam conducting tubes of a wash boiler, constructed as specified, through the water reservoirs, for the purpose of heating the water contained therein, substantially as and for the purposes herein set forth.

4th, In a clothes washer, the combination of a clothes chamber, boiling chamber, C, one or more reservoirs, E, tubes, F F, perforated mouth pieces, G G, perforated bottom, D, and valves, b d and e, all arranged as described, and operating substantially as and for the purposes herein set forth.

82,714.—EXPLOSIVE PROJECTILE.—A. O. H. Hardenstein, Clinton, Miss., assignor to himself and Marcellus A. Foute, New Orleans, La.

I claim, 1st, The combination of the disk, N, and rod, M, with a projectile, substantially as herein described, when these parts are constructed and operate substantially as and for the purpose set forth.

2d, The wedge formed bars, A, in combination with a projectile, substantially as herein described, when the same are constructed and operated substantially as herein described for the purpose set forth.

3d, The bar, A, in combination with the disk, N, when these several parts are constructed and operate as herein described, in connection with a projectile, substantially as herein described for the purpose set forth.

82,715.—DEVICE FOR CASTING LUGS AND DOVE TAILS.—George W. Herrick (assignor to himself and H. H. Gibbs), Stuyvesant, N. Y.

I claim, 1st, The hand tool, B, for forming the mold in which the spur, b, is cast upon the lug, a, of a stove top, consisting of the hollow and slotted cone, C, bearing the lever, f, hung upon the transverse shaft, e, the projection, g, upon the lower end of said lever being held through the side of the cone by the spring, i, upon the upright, h, all arranged and operating as described for the purpose specified.

2d, The tool, H for forming the mold in which the spurs, k k, are cast upon pin, j, consisting of the cylinder, I, whose lower end is slotted upon opposite sides at r r, the rod, l, having the projecting foot, m, and hung loosely upon the shaft, n, which works in the slots, o, of the cylinder, I, said projecting foot being held above the slots, r, by means of the spring, p, bearing against the shaft, n, all arranged and operating as described for the purpose specified.

3d, The tool, M, for casting the beveled lugs, w w w, upon the stove plate, J, consisting of the plate, a', having the slides, b' b', provided with projections; c' c', which are kept within the projections, d', by means of the spiral springs, e' e', all arranged and operating as described for the purpose specified.

82,716.—SOLE-CUTTING MACHINE.—Micah Hobbs, Natick, Mass.

I claim the combination of the bed, B, and its mechanism for operating or moving it, as described, with the rotary cutter, A, and mechanism for elevating and depressing, and revolving it, in manner substantially as specified, the bed being arranged over the rotary cutter, as explained.

82,717.—BUTT HINGE.—H. Hockemeyer, Toledo, Ohio.

I claim, in combination with a loose pin butt hinge, the collar, d, the lip, e, and the slots, f and g, constructed and arranged substantially as shown and described for the purposes set forth.

82,718.—STAVE MACHINE.—James Holmes, Belfast, Me.

I claim the pinions, f, and shaft, A, arranged with reference to the racks, g, of the bolt carriage, the shaft, L, pinions, i, shaft, N, pawl, o, and lever, F, whereby the bolt carriage is moved evenly toward the saw, as herein described for the purpose specified.

82,719.—MODE OF PRESERVING FRUITS, MEATS, VEGETABLES, AND OTHER PERISHABLE SUBSTANCES.—J. Burrows Hyde, New York city.

I claim the material described for the purposes set forth.

82,720.—SUSPENDER AND SHOULDER BRACE COMBINED.—Ebenezer Jennings, Jr., New York city.

I claim, 1st, A combined shoulder brace and suspender, provided with the loop, C, on one end of each of the main straps, adapted to receive the reverse ends of the opposite straps, substantially as and for the purpose set forth.

2d, In combination with a combined shoulder brace and suspender, provided with the loop, C, on one end of each of the main straps, as and for the purpose described, the button hole tags, B, as and for the purpose specified.

3d, In combination with the subject matter of each of the said first and second claims, an adjustable slide, through which both of the main straps pass, crossing each other, substantially as shown and described.

82,721.—FURNACE DOOR.—Luman F. Johnson, Buffalo, N. Y.

I claim the rebated fire bricks, B, so arranged within the cast iron frame, as to overlap the flanges, a', thereof, and protect the same, substantially as described.

82,722.—WASHING MACHINE.—John Stafford Kelley, New York city.

I claim the combination, in a washing machine, of an oscillating drum, barrel, or box, A, with a number of floating rubbers, composed of pliant sleeves, containing buoyant balls, arranged in a row, all substantially as shown and described, and for the purpose set forth.

82,723.—DRUM FOR HOT-AIR FURNACE.—John H. Keyser, New York city.

I claim the radiating attachment herein described, constructed with an opening through the top of its drum, A, substantially as specified.

82,724.—TOY HOOP.—John L. Lay, Buffalo, N. Y.

I claim the relatively stationary hoop, B, supporting an image or images, in combination with an outer eccentric and rotating hoop, A, provided with rollers, e e, or their equivalent, which gives motion to the image through intermediate levers, h, and connecting rods, i, or their equivalent, substantially as set forth.

82,725.—STRAP BOLT.—William J. Lewis and Henry W. Oliver, Jr., Pittsburg, Pa.

We claim a new article of manufacture, iron rolled to constitute a series of blanks, in bars, for strap bolts of the form herein described.

72,726.—CARRIAGE SPRING.—Josiah R. Locke, San Francisco, Cal.

I claim, 1st, The box, J, elastic packing or spring, K, and the extension braces or rods, L L, attached to the side springs, G G, substantially as and for the purpose specified.

2d, The combination of the side springs, G G, with the C-spring, I, by the shackle connection, H, the C springs extending around the axle bed and attached to the reaches, substantially as described.

3d, The springs, E E, crossing the upper ends of the springs, G G, and passing over the bolster, and attached to the forward ends of the outside reaches, substantially as described.

82,727.—CARRIAGE SPRING.—Joseph R. Locke, San Francisco, Cal.

I claim, 1st, In combination with the wood and steel springs, A A, the goose neck springs, D D, constructed substantially as described.

2d, The double-acting springs, F F, and the slides, E E, in which the lower ends move, or equivalent device, the whole constructed to operate substantially as described.

82,728.—ANTI-FRICTION STEAM ENGINE VALVE.—Kellogg H. Loomis, New York city.

I claim, 1st, An oscillating steam valve, suspended from and having its bearing and turning upon an adjustable center point above its seat, in the line of its axis, substantially as described.

2d, In combination, the valve stem, support, E, yoke, F, and set screw, H, all constructed and arranged substantially as shown and described.

3d, The arrangement of the ribs, b', between the posts, extending from the base to the outer surface and apex of the cone, substantially as set forth.

82,729.—GOVERNOR FOR STEAM ENGINE.—Jeremiah A. Marden (assignor to Augustus Lynch and Reuben K. Huntoon), Boston, Mass.

I claim the arrangement and combination of the float, D, its arm, e, the tubular shaft, C, the spindle, f, vessel, A, and its cover, a, as specified.

Also, the arrangement of the said float, D, arm, e, spindle, f, tubular shaft, C, lever, E, and its hanger, H, as set forth.

Also, the arrangement of the compensating arm, M, and weight, N, valve arm, l, hanger, H, lever E, spindle, f, tubular shaft, C, float, D, arm, e, and the vessel, A, substantially as specified.

Also, the combination of the cam, n, slotted arm, m, and the movable standard, o, with the hanger, H, lever, E, spindle, f, tubular shaft, C float, D, arm, e, and the vessel, A, substantially as set forth.

82,730.—AMALGAMATOR.—George A. Mariner and Julian Kune, Chicago, Ill.

We claim, 1st, The cylinder, a c, provided with the conical plate or bottom, b, in combination with the cylinder, d f, supported above the bottom, substantially as shown.

2d, The annular plate or diaphragm, e, to regulate the dispersion of the ores, when provided by the rods, u, substantially as specified.

3d, The perforated annular plate, r, when provided with the rods, substantially as and for the purposes described.

4th, The inclined partition or chute, B, constructed and operating in combination with the discharge spout, v, substantially as specified.

5th, The tube or pipe, b, when made to pass through the furnace, w, in combination with the escape or condensing-pipe, G, substantially as and for the purposes specified.

6th, The extension feed pipe, l g, whether used with or without a screw carrier, substantially as specified.

82,731.—MANUFACTURE OF ARTIFICIAL STONE.—A. H. Marret, Water Works, Ky.

I claim the process of manufacturing block, substantially, for all building purposes, as herein described.

82,732.—APPARATUS FOR WASHING, BLEACHING, AND CLEANSING YARNS, BOBBINS, AND OTHER MATERIALS.—James Garth Marshall, Leeds, England.

I claim, 1st, The combination, with the vessel, A, of the supply pipe, D, opening into a chamber, C, one or more sets of spool holding studs, e and h, and an exhaust pipe, N, substantially as and for the purpose described.

2d, The employment of the open web, S, in combination with a closed vessel, A, substantially as and for the purpose described.

82,733.—FENCE.—Nathan Maxson, Wilmington, Ohio.

I claim the fence, A B C, constructed as described, that is, having the foundation, A, interior, B, and covering, C, the latter being laid on in sections, with beveling edges, and being strengthened, at regular intervals, by bars, formed in the manner described, the whole being combined and arranged as and for the purposes set forth.

82,734.—SCHOOL SLATE.—Frank Melville, New York city.

I claim the notches, a a, in the inner edge of the frame, B, of the slate, in connection with the spring, b, and the removable copy, C, all arranged substantially and for the purpose herein set forth.

82,735.—FILTER FOR SACCHARINE AND OTHER LIQUIDS.—Helen Merrill, New York city. Antedated September 30, 1868.

I claim, 1st, The arrangement of the filtering material, partly inside and partly outside the filter.

2d, Operating a sheet of filtering material so that it passes in and out of a filter, either continuously or at intervals, as may be required.

3d, Supporting and securing a traveling apron by means of endless belts, substantially as described.

82,736.—ROTARY BLOWER.—James Mitchell, Philadelphia, Pa.

I claim the combination of the direct tangential discharge port, H, rotary fan, D, eccentric casing, A, and concentric partition, E, all constructed and arranged as herein represented and described, for the purposes specified.

82,737.—WATER METER.—George R. Moore, Lyons, Iowa.

I claim, 1st, The water ways, o o o o, through the plate, A, in the manner and for the purpose herein set forth.

2d, The forcing plate, C, upon its journals, f, operated by the water, substantially in the manner and for the purposes herein set forth.

3d, The springs, d d, used in operating the valve, B, substantially in the manner and for the purpose herein set forth.

4th, The levers, a a, and regulating screws, g g, substantially in the manner and for the purpose herein set forth.

5th, The dividing plate, e, substantially in the manner and for the purpose herein set forth.

82,738.—CLAMP FOR IRON STRUCTURE.—James M. Moorehead, Brooklyn, N. Y.

I claim the four plates, A B C and D, formed and combined substantially as shown and described, for the purpose of clamping crossed rods, all as set forth.

82,739.—MACHINE FOR DESICCATING LEACHED TAN AND OTHER SUBSTANCES.—Charles H. Moseley, Winchester, Mass.

I claim the arrangement, as well as the combination of the endless apron or conveyer, B, the hopper, C, through which it passes, the auxiliary hopper, M, and the pair of heating and expressing rollers, K L, such being provided with mechanism for operating them, substantially as described.

Also, the arrangement and combination of the leaching vat, A, the endless apron, B, the hoppers, C M, and the pair of expressing rollers, K L, the whole being disposed with a frame, as set forth.

Also, the combination of the elevator, N, with the expressing rollers, K L, the two hoppers C M, and the endless apron, B, or the latter and the leaching vat, A, the whole being arranged in a frame, and provided with mechanism for operating them, substantially in manner and for the purpose or objects as hereinbefore specified

82,740.—PATTERN FOR CUTTING OUT SHIRT.—Jas. H. Myers (assignor to himself and C. T. Rice), New York city.

I claim the diagram for cutting shirts, consisting of the back, yoke, front, bosom, neck band and sleeve patterns, of the configuration shown, having graduated measurements delineated thereon, substantially as shown, for the purpose specified.

82,741.—FEEDING AND COOLING DEVICE FOR GRAIN MILL.—John Nairn (assignor to himself and Mathew Pfafflin), Milton, Ind.

I claim the arrangement of the vessel, A, tubes, B B C, and curved lateral tubes, E E, and scraper, D, when combined and operated substantially as and for the purpose herein described.

82,742.—ROTARY STEAM ENGINE.—Elim Osborn (assignor to himself and Henry Beard), Economy, Ind.

I claim, 1st, The combination of the revolving disk plate valve, h, steam chest, D, and shaft, A, substantially as set forth.

2d, The arrangement of the steam pipes, E E, steam chest, D, and apertures, m, with reference to the shaft, A, and wheel, B, substantially as described.

82,743.—CIGAR PIPE.—Adolphe Achille Pathi, Paris, France.

I claim a tobacco pipe, having a lid, b, provided with a prolongation, d, terminating at the outer end in a form resembling a burning cigar, and perforated for the admission of air to support the combustion of the tobacco, substantially as and for the purpose described.

82,744.—RAILWAY RAIL JOINT.—E. G. Patterson, Pithole City P.O.

I claim, 1st, The chair, D, made with the inner side of its jaws inclined or wedge-shaped, substantially as herein shown and described, and for the purpose set forth.

2d, The clamps, F, constructed as described, and provided with bolts, G, and nuts, H, in combination with the fish-plates, C, by which they are supported, and with the wooden bar or bars, E, which they support, substantially as herein shown and described, and for the purpose set forth.

3d, The combination of fish plates, C, and chair, D, with each other and with the ends, A B, of the rails, substantially as herein shown and described, to form a rigid support for the said ends of the said rails.

4th, The combination of the fish plates, C, chair, D, wooden bar or bars, E, and clamps, F, with each other and with the ends, A and B, of the rails, substantially as herein shown and described, and for the purpose set forth.

82,745.—QUICKSILVER FEEDER FOR QUARTZ MILL.—John Pattison, Nevada, Cal.

I claim, 1st, The quicksilver fountain, C, with the vertical pipes, D, and F, above and below the horizontal shaft, substantially as described.

2d, The cup, G, in the horizontal shaft, E, graduated by the set screw, G, or their equivalents, substantially as and for the purpose described.

3d, Coupling the shaft, E, together by the slotted ring, H, and keys, H' H', and operating the machine by the lever, K, pawl, K', and toothed wheel, J, the whole constructed and arranged to operate substantially as described.

82,746.—VENTILATOR.—Jethro Peckam and John Peckam, Middletown, R. I.

We claim the combination, with the ridge cover, A, supported on the vertically sliding studs, B of the winding shaft, C, and cords, D, substantially as and for the purpose specified.

82,747.—POROUS ALUM.—Henry Pemberton, Allegheny City Pa.

I claim as a new article of manufacture, the sulphate of alumina, prepared in a porous or visicular state, whether in lump or ground to a coarse or fine powder, substantially as described.

82,748.—MACHINE FOR STRETCHING AND BLOCKING HATS.—Starr Polley, Brooklyn, N. Y.

I claim 1st, The arrangement of the flat elastic ring or band, T, of rubber, over or outside of the hat body f as shown and described in combination with stretching device, B, when arranged to operate relatively thereto during the stretching operation, substantially as and for the purposes herein set forth.

2d, The elastic band, T, in combination with a hat-body and with the block, @, and stretching device, B so as to perform the double function of clamping or holding the hat body in place upon the stretching machine in the act of stretching the tip, and also of holding the body upon the block during the subsequent operation, substantially as herein described.

82,749.—HORSE HAY RAKE.—Peter Prescott (assignor to Isaac Hall, William J. Hall and C. M. Prescott), Booneville, N. Y.

I claim the plates, a a, rods, i, arms, b b, arranged substantially as described, for the purpose of lessening the pressure of the shafts or tongue of a revolving horse rake, all as set forth.

82,750.—LANTERN.—George W. Putnam, Boston, Mass.—Antedated September 26, 1868.

I claim the employment or use, with a portable lantern, of a movable magazine, when all are constructed and arranged substantially as shown and described.

82,751.—CUT-OFF FOR STEAM ENGINE.—George W. Rawson, Cambridgeport, assignor to himself and Michael Hittinger, Somerville, Mass.

I claim the arrangement and combination of the stopping chains with the steam chest, the sliding, main, and cut-off valves, the springs, k k, the rods, g g, the paws or catches, m m, and the tripper, p, to be applied to a governor, the whole beign to operate in manner as described.

Also, the arrangement of the valve seat projections, c', or the equivalents thereof, in relation to the steam chest, A, the main and cut off slide valves, B e e, the stopping chains, the springs, k k, the cut off valve rods, g g, the paws, m m, and the tripper, p, the whole being as specified, the valve seat projections enabling the steam to effect the balancing of the cut-off valves as explained.

82,752.—MATCH SAFE.—Hiram Richmond (assignor to Chas. Parker), West Meriden, Conn.

I claim the match safe, constructed as described, of the back plate, A, the box, B, having the vertical opening, b, for the thumb and finger, and the inclined hinged lid, C, having opening, c, corresponding to the opening, b, in the box, all arranged as described for the purpose specified.

82,753.—CULTIVATOR.—William Rodgers, Lynnville, Ind.

I claim the rake, K, supported and braced as described, by the vertical and lateral rods, and having itself vertical teeth, in combination with the cultivator, provided with the steadying wheel, H, all constructed and arranged as and for the purpose set forth.

82,754.—FOLDING EASY CHAIR.—Charles C. Schmitt and Rudolph Wodrich, New York city.

We claim, 1st, The application to the roller, F, around which the band G, is wound, of the spring, c, ratchet wheel a, and spring pawl, b, all made and operating substantially as herein shown and described, for the purpose of locking the chair automatically in any desired position as set forth.

2d, The cam, J, arranged in connection with the spring pawl, b, for the purpose of allowing the band to be unwound and the seat to be lowered, substantially as herein shown and described.

3d, Pivoting the seat, I, to one set of supports only, of an X-shaped chair frame, when said frame is provided with a self-acting band, G, and roller, F substantially as and for the purpose herein shown and described.

4th, The rod, K, and lugs, g, when arranged on an X-shaped stool frame to prevent extreme expansion of the same, as set forth.

82,755.—FOLDING CHAIR.—Charles C. Schmitt, and Rudolph Wodrich, New York City.

We claim the folding chair, consisting of the combination of the seat, A, which is pivoted or hinged to the legs, B C, with the rods, a b d e, bands or staples, c f, rod, h, slotted arms, E, hinged to the legs, B, pins, k, and band, I, all made and operating substantially as herein shown and described.

82,756.—EXPRESS SIGNAL.—Chas. H. Seawell (assignor to G. F. Lewis), St. Louis, Mo. Antedated Sept. 24, 1868.

I claim the signs, c and c', placed in pairs on a pivot wire, b, and arranged with calling signs on one face, but blank on the reverse, so that the call shows on both sides when it shows at all, as described

82,757.—BEEHIVE.—Thomas Shields, Hillsboro, Ohio.

I claim 1st, The two series of removable honey frames, of different widths, arranged the one above the other, between the upper and lower ventilating air chambers, substantially as herein set forth.

2d, The glazing of the outermost of the lower series of honey frames in the hive, when the said glazed honey frames are located opposite to the removable sections, B B, of the side casings of the hive, substantially as herein set forth.

3d, The glass face of the alighting board, h, when the said alighting board is arranged with the other parts of the hive, substantially in the manner herein set forth.

82,758.—GOVERNOR FOR ENGINES, WATER WHEELS, ETC.—James P. Sibley and Arthur Walsh, Bennington, Vt.

We claim, 1st, The arrangement of the eccentric, L, on the shaft, B, for operating slide, N, and the collar, I, fitted on shaft, B, and connected by shaft, K, and levers, J T, and arm, S, for the purpose of operating the shell, R, substantially as specified.

2d, The slide, N, provided with the pawls, O O', in connection with the wheel, P, all arranged, substantially as set forth.

3d, The metallic strap, W, attached to the spool, X, on shaft, Q, connected with the shafts' V and K, all arranged as specified.

4th, The slide, A', when arranged or placed in relation with slide, N, and wheel, P, substantially as specified.

82,759.—SAW SET.—L. T. Smart, Ossipee, N. H.

I claim the die, A, adjusted in the holder, B, by the screw, F, and provided upon its upper face with faucets of varying inclination, corresponding to the inclinations of the faucets upon the under side of the movable die, D, all constructed, arranged, and operating as herein described and shown, for the purpose specified.

82,760.—SPRING SEAT.—Chas. B. Smith (assignor to himself and Quincy A. Fisk), Springfield, Ill.

I claim the improved spring seat bottoms composed of the hooked strips, A, riveted together as described, in combination with the double coiled springs, supported on the frame, and provided with the loops, B, substantially as and for the purpose described.

82,761.—STOVE DRUM.—Chas. D. F. Smith, Geneva, Ill.

I claim constructing the inclined plane forming the spiral flue around a central drum, cylinder, or reservoir, wholly or in part in sections, susceptible of being adjusted to form a continuous circuitous spiral flue, or to open vertically and permit a direct vertical draft, substantially as and for the purposes set forth and described.

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82,762.—WATER GAGE.—H. P. Stafford and H. H. Stafford, Decatur, Ill.

We claim, 1st, The employment of an independent registering pointer, R, in combination with the float pointer, P, substantially as and for the objects herein described.

2d, Operating the registering pointer, R, by means of the float pointer, P, substantially as and for the purposes shown and described.

3d, Having the registering pointer, R, pivoted upon the sector, substantially as and for the purpose hereinbefore shown and described.

82,763.—PROCESS OF TANNING HIDES.—Geo. A. Starkweather, Waymart, Pa.

I claim, 1st, The process of tanning hides or skins into leather, by the use urine, alkali, fermented wheat bran, and decoction made from plants, salt, oil of virriol, and tan liquor, as set forth.

2d, The use of plants in laying away hides or leather.

82,764.—CLEVIS FOR PLOWS.—David Stewart, Corinna, Me.

I claim in combination with the spiral shaft, D, and link, E, the slotted plate, F, clamp bolt, C, and nut on the stirrup, G, for adjusting the side draft, as herein set forth.

82,765.—DESK AND SEAT.—G. A. Stewart, Des Moines, Iowa.

I claim a combination of the standards, A A, folding seat, C, bars, D D, blocks, E E, folding desk, F, shelf, G, box, H, and slide, I, all arranged and operating as herein set forth.

82,766.—SHEET METAL CAN.—John H. Stone, Philadelphia, Pa. Antedated Sept. 26, 1868.

I claim, 1st, In combination with the internal bead, a', a lap joint, consisting of three thicknesses of the sheet metal pressed closely together, and the upper half of the same then bent inward to a right angle, so as to produce the annular flange, d, around on the inner side of the chime of the vessel, and parallel with the end plate of the same, substantially as set forth and described, for the purposes specified.

2d, The sliding stopper or cover, E E, constructed and operated as set forth, for the purpose of closing the mouths of sheet metal vessels, as described.

82,767.—COMBINED FLOATING FIRE ENGINE AND WRECKING PUMP.—George W. Talcott (assignor to himself and Isaac D. Voak), Buffalo, N. Y.

I claim, 1st, The pipes, C D, provided with value, c, and valve, f, or cap, and uniting and connecting with a force pump, B, arranged in the hold of a vessel, substantially in the manner and for the purpose set forth.

2d, The combination and arrangement within a vessel of the pump, B, pipes, C D G G', and nozzle chamber, I, forming a combined floating fire engine and wrecking pump, in the manner described.

82,768.—BUCKLE.—Samuel A. Tenny, Muskego, Wis.

I claim a clamp or buckle consisting of the frame, A, having inclined grooves, E, made in the side pieces, D, and the block, B, provided with inclined flanges, F, and the loop, G, all substantially as described.

82,769.—ADJUSTING SPIRIT LEVEL.—Justus A. Traut (assignor to the Stanley Rule and Level Company, New Britain, Conn.

I claim, 1st, Suspending the vial case, c, within the stock, b, and adjusting the same to its relative position with the stock, b, by means of the plate, c', screw, or screws, e, and springs, d, substantially as and for the purpose described.

2d, The spirit vial case, B, constructed as described, with the springs, k, screws, n, operated through orifices in the plate, i, substantially as and for the purpose set forth.

3d, The combination of the adjusting plate or nuts, springs, k, and screws, n', substantially as and for the purpose described.

82,770.—HAY RAKER AND LOADER.—Lester Underwood, Ottawa, Ill.

I claim, 1st, The arrangement of the ropes, t t, and u u, in combination with the standards h h, and braces, v v, substantially as described, and for the purpose of enabling the machine to be used from the wagon.

2d, The clevis, D, and pin, c', with rope attached, in combination with the loop, b', substantially as and for the purpose described.

3d, The peculiar arrangement of the shaft, e', grooved pulleys, d' d', wheel, f', lever, h', and stirrup, k', in combination with the rakes, C C C, substantially as and for the purpose described in the foregoing specification.

82,771.—DIE FOR STAMPING STOVE PIPE DAMPERS.—Isaac Van Hagen, Chicago, Ill.

I claim a die, A G, the movable part, A, of which has a V-shaped projection, C, fitting in a corresponding depression, E, in the stationary part, G, and the stationary part, G having V-shaped projections, D F, fitting in depressions, B B, in the movable part, A, as and for the purpose described.

82,772.—SKIRT SUPPORTER.—N. A. Vurgason, Brooklyn, N. Y.

I claim the skirt supporter, constructed as described, of the hinged metallic zone, A A, whose ends are secured together by the overlapping spring catch, D, and whose outer surface is provided with the hooks, a a, covered and protected by the flap or fillet, B, said zone being attached at its lower edge to the inner curtain or flap, G, all arranged as described, for the purpose specified.

82,773.—LOOM FOR WEAVING PILE FABRIC.—William Webster, Morrisania, N. Y. Antedated August 24, 1868.

I claim, 1st, The guide, C, pusher, G, and sliding block, in combination, when constructed, arranged, and operating substantially as described, and for the purpose set forth.

2d, The vibrating lever, D, having grooves, E E', and oscillating guide, F, or its equivalent, in combination with the pusher, G, or its equivalent, for the purpose set forth.

3d, In combination with the vibrating lever, D, with or without the grooves E E', and oscillating guide, F, the oscillating lever, H, oscillating block, I, having incline planes, and sliding rod, J, substantially as herein described, and for the purpose set forth.

82,774.—SUGAR PAN DERRICK.—Andrew J. Weed, Hardwick, Vt.

I claim, 1st, The pivoted or hinged frame, A, constructed substantially as described, in combination with the circular track, C, as and for the purpose set forth.

2d, The combination of the adjustable sliding frame, D, shaft, E, drum, e', shafts, F F, cross bar, I, adjustable vertical bar, H, and pivoted bar, G, with each other, and with the pivoted frame, A, substantially as herein shown and described, and for the purpose set forth.

82,775.—COMBINED HARROW AND CULTIVATOR.—N. W. Wheeler, Ripon, Wis.

I claim the combination, and mode of attachment of a harrow and cultivator, substantially as described, and for the purposes specified.

82,776.—DENTISTS' CHAIR.—Otis C. White, Hopkinton, Mass., and Austin T. Ashmead, Hartford, Conn.

We claim the combination and arrangement of the slotted arched bar, H', the swivel bar, G, the clamp screw, I, and the friction collar, g, applied to the spindle and the seat frame, as specified.

Also, the arrangement of the metallic seat frame, D, made with the foot and arm holes as described, the foot rest supporting frame, E, and the elevating screws, and their operative shaft and gears, as explained.

Also, the combination, applied to the stand and the seat frame, for effecting the adjustment of the latter in vertical and horizontal planes, as set forth, such consisting of the spindle, the feather connection, the rack, the scroll cam, with its cranked shaft, the collar, g, the clamp screw, f, the arched bar, H', and the swivel bar, G, arranged as specified and represented.

82,777.—HORSE POWER.—B. H. Wilcox, Petroleum Center, Pa.

I claim the combination of the table, A, having cam profiles, C, and mounted upon the cross timber and plate, J I, the pivoted lever D, rollers a a, connecting rod, E, dove tailed slide, H, and bed, G, all constructed and arranged to operate as described, for the purpose specified.

82,778.—BUTTON.—Frederick Wittram, San Francisco, Cal.

I claim 1st, A button or stud, having an opening in its fastening disk or plate, closed by a movable segment or piece, substantially as shown and described.

2d, In combination therewith, a closing or retaining spring, substantially as set forth.

82,779.—CUTLERY.—Walter D. Woods (assignor to himself and Ebenezer F. Woods), Bennington, N. H.

I claim the handle, B, made tubular throughout its length, and having the connection piece, E, of the two bolsters arranged in the bore of such handle as specified.

Also the handle as made with the tang socket chamber, g, arranged in it in manner, and to open out of its upper end, and with a passage, f, extended from such chamber to the rear of the handle, as set forth.

Also, in combination with the chamber, or socket mold, g, formed in the handle, as set forth, the metallic bolster, C, and tang supporter, p, cast in one piece, in and against the handle, and on the tang, as set forth.

Also the combination of the rivet projection passage, h, of the handle, B, with the bore, f g, thereof, as set forth.

And in combination with the handle, B, and its metallic bolsters, C D, and their connection, E, when cast in one piece in the handle, as described, the rivet projecting molding passage of the handle, and the metal, o, cast therein and in one piece with the connection, E, as specified.

Also, the combination of the rear tang hole, l, with the metallic extension n, the rivet projection, o, and its molding passage, h, of the handle, B, as set forth.

Also, the handle as formed tubular throughout, or from end to end, and with the two bolsters and their metallic connection cast in one piece with respect to such handle, and upon the tang of the blade, the whole being substantially as described.

82,780.—MACHINE FOR SCOURING SHEET METAL.—Horace B. Wooster, Waterbury, Conn., assignor to Waterbury Brass Company. Antedated April 6, 1868.

I claim, 1st, The described arrangement of the revolving brushes, B C, guide roller, F, winding up roller, D, gearing, E, and adjustable riders, b c, all operating as described, to polish thin elastic strips of sheet metal, as herein set forth.

2d, The revolving brushes, B and C, in combination with the adjustable riders, b and c, all made and operating substantially as herein shown and described.

3d, The described arrangement of the cylinder, D, with relation to the revolving brushes, B C, and adjustable riders, b c, for winding and unwinding the sheet metal, in the manner herein set forth and shown.

82,781.—COMPOUND DOUBLE TREE.—John Wykoff, Grant City, Mo.

I claim the double trees, D D, tongues, A A, single tree, E G E, chains, b b, or their equivalent, all constructed and operating substantially as and for the purpose shown and described.

82,782.—HARVESTER.—Geo. W. N. Yost (assignor to Corry Machine Company), Corry, Pa.

I claim the elastic floating bar, S, rigidly attached to the main frame or body, A and A', with the end, l, fastened to the middle of the hind end of the body, and with end, k, fastened to the middle of the fore end of the body, as described for grass and grain cutting machines.

82,783.—FURNITURE CASTER.—Anson T. Adams, Indianopolis, Ind.

I claim the combination of the spherical socket of the halves, B C, with the hexagonal edge, held together by the nut, d, and the conical screw, e, as and for the purpose specified.

82,784.—CLOD CRUSHER.—Dr T. H. Ashton, Defiance, Ohio

I claim the double harrows, A A, and rollers, D D, when the same are so combined and arranged as to operate substantially as described, as and for the purpose specified.

82,785.—EQUALIZING WHIFFLE TREE.—H. W. Austin, Portage, Mich.

I claim, 1 t, The arrangement of the equalizing eveners, E, with both of the double tree strips, A, grooved pulley, p, chain, F, and whiffle trees, D and D', all constructed and operating substantially as and for the purpose herein set forth.

2d, The arrangement of the eveners, E E, in such relation to the whiffle tree D', by means of the pulley, P, and chain, F, that when an outside horse starts, the reaction will be divided between the other horses, in the manner substantially as described.

82,786.—GAS MACHINE.—N. W. Bancroft, Worcester, Mass.

I claim, 1st, The pump or fan, consisting of the cylindrical case, F, with the curved partitions, b, and having the inlet openings, e, and exit holes, o, arranged substantially as described.

2d, The air chamber, C, having the partition, h, with the valve, i, and pipes p, arranged to operate as set forth.

3d, The reservoir, B, with the flexible diaphragm, f, and the gas pipe, X, with its regulating valve, Z, constructed and arranged to operate substantially as described.

4th, The copper plate, K, located under the chamber, J, for the purpose of conducting and equalizing the application of heat to the fluid as set forth.

5th, The circulating chamber, formed by the application of the plate, C, with its opening, m, arranged within the chamber, J, substantially as described.

6th, The use of the cement, herein described, for preparing the flexible diaphragm and other parts of the machine, as set forth.

82,787.—PROPELLING APPARATUS.—E. S. Barnes, Nebraska City, Nebraska.

I claim, 1st, The cogged sectors, C C1, in combination with the paddle, D, when arranged and operated substantially as set forth.

2d, The combination of the reversing sectors, E E1, and their operating bar E2, when acting to operate the bar, G3, and rack, c3, for feathering the paddles at either end of stroke, and reversing the same, substantially as set forth.

82,788.—COMPOSITION CLOCK DIAL.—Stephen Barnes, New Haven, Conn.

I claim, 1st, A composition clock face or dial, formed from a plastic composition, substantially in the manner described.

2d, A composition clock dial, in which the raised letters or ornamentations while made in one piece with the body of the dial, are formed of a composition differing in color from that of which the body is composed.

3d, The application, to a composition clock dial, of a perforated plate, or its equivalent, pressed into the dial while the latter is in a plastic state, substantially as set forth.

82,789.—SAW FOR FELLING TREES.—F. Bauschtliker (assignor to himself and Frederick Gentner), Washington, D. C.

I claim the double bladed saws, J J, screw, N, ratchet, P, and movable frame, G, when arranged, combined, and operated as herein described, and for the purpose set forth.

82,790.—BUSHING FOR WHEELS.—Thos. Blake, Stockton, Cal.

I claim the bushing, C, provided with the cylindrical bore, D, and having its external surface polygonal, as and for the purpose described.

82,791.—FOLDING CHAIR.—Peter Born, New York city.

I claim, 1st, The part, C, composing the arm pieces and front legs when constructed in one piece, attached to the back, B, by pivots, a, and arranged to fold up in the manner and for the purpose described.

2d, The parts, B and C, when constructed as described, in combination with the hinged seat, D, substantially as and for the purpose set forth.

3d, The stops, d, and cross bar, c, in combination with the part, C, seat, D, and part, B, of a chair, all constructed and operating as and for the purpose set forth.

82,792.—MACHINE FOR TENONING BLIND SLATS.—T. J. Bowdle, S. R. Lawder, and F. E. Johnson, Piqua, Ohio.

We claim, 1st, A T-shaped vibrating lever, P, in combination with toggle joint levers, N N, suitable connecting links, M M, and with sliding carriages, C C, carrying the shoulder-cutting bits, a a, of a slat-tenoning machine, all arranged and operating substantially as and for the purpose herein set forth.

2d, In combination with the foregoing devices, combining with one arm, p', of said vibrating lever, P, a connecting link, R, pivoted to a collar, G, embracing the tubular center bit, F, of the machine for the purpose of operating the same, all substantially as is herein specified.

82,793.—COMBINED LAND ROLLER AND CLOD PULVERIZER.—John Brewer, New Vienna, Ohio.

I claim the drums, B B, provided with knives, C C, in combination with the cultivator, E, when constructed and operating substantially as and for the purposes herein set forth.

72,794.—PEACH PARER.—James H. Brown, Mitchell, Ind

I claim the curved prong, a, pivoted in its center to the arm, H, above the stationary prong, b, and its rear end resting on a spring, d, in combination with the knife supporting shaft, I, pivoted at its lower end, and working in a slot in the frame, A, all as herein shown and described.

82,795.—CHEESE CUTTER AND BOX.—Smith S. Brown, Woonsocket, R. I.

I claim a cheese box and cutter, having tables D and E, pivot, d, pin, e, cover, A, cutting wire, H, and guide, g, constructed, arranged, and operating substantially as specified.

82,796.—CURTAIN FIXTURE.—Smith S. Brown, Woonsocket, R. I.

I claim a fixture for window curtains, having roller, B, slotted plates, C D and G, with their respective thumb screws, head plate, E, swinging plate, O, pulley, Y, and cord, V, constructed, combined, and arranged substantially as herein specified.

82,797.—SASH FASTENING.—Wm. Brown, Duncannon, Pa.

I claim the device, composed essentially of the angular plate, D, with the with the shafts, E and F, bearing the slotted plates, H H, and the weighted handles, G G, when used in combination with the notches, n n, and block, i, upon a sash or door, substantially as and for the purpose specified.

82,798.—BOOT AND SHOE HEEL POLISHING MACHINE.—B. Q. Budding, Worcester, Mass.

I claim, in combination with the jack-supporting bearing or bracket, a jack, held up towards the polishing tool by a spring, substantially as set forth.

Also, in combination with the jack plate, r, the heel clamping mechanism, substantially as shown and described.

72,799.—HOISTING APPARATUS.—F. P. Canfield, Brighton, Mass.

I claim, 1st, The hoisting barrel, C, when supported independently of the fixed bearings, K K', arranged and operating substantially as shown, and for the purpose set forth.

2d, The levers, L L', when so arranged, in relation to the winding barrel, C, as to convey a portion of the weight suspended therefrom to act upon the brake device, substantially as described, and for the purpose set forth.

3d, The general arrangement of the levers, Q Q', bar, R, and guide rollers, S S', when acted upon by the lateral motion of the pull rope, T, substantially as described for the purpose set forth.

82,800.—BED BOTTOM.—John Christie, Lowell, Mich.

I claim, in a bed bottom, composed of the springs, A A, connected and constructed as described, the arrangement of the short bars, C C, cross bar, E, and slotted diagonal bar, F F, and screw, G, the whole operating as specified.

82,801.—BLIND SLAT TENONING MACHINE.—John J. Clark and Thomas Clark, Elgin, Ill.

We claim cylinder, P, provided with saws, e and e", knives, 1 2 and 3, in combination with wheels, W and W", constructed and arranged to operate together substantially as and for the purpose set forth.

82,802.—SLAT MACHINE.—Lyman S. Colburn, Oberlin, Ohio.

I claim, 1, The revolving heads, I, constructed with apertures therethrough, corresponding with the form of the cross section of the slat, for its insertion therein endwise, substantially as set forth.

2d, The combination of the arms, H H', carrying the revolving heads, I, the wheel, X, segmental rack, J, and notched hub, f, all supported on the rock shaft, G, for operation substantially as described.

3d, The arrangement and combination of the sliding bar, M, and head, N, with the holding block, W, operating together by means of the wrist, t, toe, r, and springs, x x', substantially as shown and described.

4th, The staple holder, supported on the sliding head, N, consisting of two vertical standards, p' p', provided with a lower outlet at right angles to their position, for the passage of and to guide a single staple, when propelled by the driver, q, substantially as set forth.

82,803.—MACHINE FOR BORING WINDOW BLINDS.—Lyman S. Colburn, Oberlin, Ohio.

I claim, 1s, the marker, m, arranged and operating in combination with the notches, e, in the under side of the feed strip, N, the pawl, q, and reciprocating frame, F, essentially as specified.

2d, The feed strip, N, pawl, w, pitman, t, and wrist, s, arranged and operating substantially as shown and described.

3d, The combination of the reciprocating spindle frame, F, the eccentric pin, k, and wrist, s, on the revolving head, J, and the pitman, t, and pawl, w, when said pin and wrist are so arranged as to raise the bits, l, into the wood as soon as the pawl, w, has finished each feed motion of the stuff, substantially as set forth.

82,804.—DOOR AND GATE CLOSER.—Henry N. Conklin, Indianapolis, Ind.

I claim a gate or door closing device, having lever, a, pivot, b, and chain, d, constructed, arranged, and operating substantially as herein specified.

82,805.—MAKING CRANK SHAFT.—Jules Converse, Paris, France.

I claim the improved method, herein described, of making crank axles, by forging them first, as usually done, in one solid piece, then boring the shouldered parts thereof, and strengthening the same by introducing separate pins, D, of steel or other strong material, embraced entirely within the metal, as and for the purposes herein set forth.

82,806.—POTATO DIGGER.—W. J. Cowan, Cortland, N. J.

I claim the combination of the slides, b b, the point or share, a, and the curved rods, c c, with the apron, d, when constructed substantially as above described and for the uses and purposes set forth.

82,807.—RAILWAY CAR COUPLING.—R. A. Cowell, Cleveland, Ohio.

I claim, 1st, The connecting bolt or pin, C, constructed with the pivots, a, and arms, x, and operating in combination with the spring, f, and slot, b, substantially as and for the purposes described.

2d, In a railway-car draw head, arranging the chamber, D, with the superior recess or apartment, E, in combination with a connecting bolt or pin, as C, having a rotary and vertical action, all constructed and operated substantially as herein described.

82,808.—MACHINE FOR GRINDING CUTTERS OF MOWING MACHINE.—C. B. Curtis, Jordan, N. Y.

I claim, 1st, A frame for supporting a cutter bar upon the frame of an ordinary grindstone, constructed with an adjustable slotted bed piece, A, and clamp hooks, B, and an oscillating support for the clutches, by which the cutter bar is secured, substantially as described.

2d, The combination of the bed piece, A, so constructed that it may be adjustably attached to the grindstone frame, the side pieces, E, attached to the bed piece, so as to be vertically adjustable, and the clutches, for holding the cutter bar, substantially as described.

3d, The clutches, H, attached to the frame by crank rods, or arranged that the knives may be set at any required angle, substantially as set forth.

4th, In combination with the end clutches, an intermediate clutch, attached to an adjustable standard, and sliding upon the cross bar, G, substantially as and for the purpose set forth.

82,809.—PLOW.—S. T. Denise, Red Bank, N. Y.

I claim, 1st, The coulter, when terminating at its lower end in the point, A, and its upper end in the bent lip, e', between which is the sharp cutting edge, c, the whole being constructed substantially as described.

2d, The brace rod, F, when constructed of a single piece uniting the beam and both handles, substantially as and for the purpose specified.

82,810.—RAILROAD CAR HEATER.—Isaac Dripps, Fort Wayne, Ind.

I claim an apparatus for heating and ventilating railroad cars, combining the following elements, viz: a double funnelled hood, A, with a centrally-suspended oscillating valve, V, pipe, B, water tank, C, heater, D, with with inclosing casing, arranged as described, a pipe, E, and registers, R, and a ventilator so constructed as to create an outward draft, substantially as described.

82,811.—HOT-AIR FURNACE FOR HEATER.—J. B. Driscole, New York city.

I claim the fire-pot, A, with a horizontal extension, G, of a pyramidal or conical form, constructed and operated substantially as and for the purpose set forth.

82,812.—LIQUID METER.—Ernest Marie Du Boys, Paris, France. Antedated May 9, 1867.

I claim, in combination with the shallow gaging vessel, divided into two compartments by an elastic diaphragm, which moves to and fro therein, by the pressure of the liquid on one side and then on the other side thereof, a mechanism constructed and operated substantially as herein described, for putting the compartments in alternate communication with the entrance and exit pipes or passages, as and for the purpose herein described.

82,813.—HORSE SHOE CALK SHARPENER.—William Duncan Vinton, Iowa.

I claim the shank or bar, A, spring, b, and cutting wheel, B, all combined and operating substantially in the manner and for the purpose specified.

82,814.—CULTIVATOR.—Daniel S. Early, Hummelstown, Pa.

I claim, 1st, The sliding bar, E, in combination with the central beam, A, the hinged side beams, D D', and the fastening, d, substantially as described and for the purpose specified.

2d, The arrangement of the beams, A D D', slide, E, clevis, F, wheel, B, handles, C C, and plows or teeth, P P P, in the manner shown and described.

82,815.—APPARATUS FOR TANNING HIDES.—Albert G. Eaton, Governeur, N. Y.

I claim, 1st, In combination with vats for tanning hides, a series of lifting pumps, arranged in and operated at the bottom of the vat, for raising the heavier and stronger liquids from the bottom to the top of the vat, and thus by mixing render it of more uniform strength throughout, substantially as described.

2d, Also, in tanning hides, the throwing of the tanning liquid against the hides, suspended in the air, by a force pump, or in a forced column or spray or jet, substantially as described.

3d, Also, in combination with a series of pumps, arranged in and operated at the bottom of the vat for raising the liquid in the bottom of the vat to the surface, an agitating or circulating pump, also arranged and operated at the bottom of the vat, for keeping the liquid mixed there, and of uniform strength, substantially as described.

4th, Also, in combination with a series of hides suspended in a vat, and at times dipped into the liquid and then raised therefrom and suspended in the air, a circulating and a lifting pump, or two or more of each, operated by or with the vibrating frame, carrying said hides, substantially as described.

82,816.—MACHINE FOR MORTISING, SLOTTING, AND DOVETAILING.—Jacob Felber, St. Louis, Mo.

I claim the combination of the arbor, B, pivoted by ball-and-socket bearing at D1, and guided by ball-and-socket bearing in the sliding head, D, with said head, D, the segmental plate, D2, pendulum, D3, its slot, d2 and the pivot pin, d3, when operating substantially as and for the purpose set forth.

82,817.—WASH-BOILER.—George Fenn, Boston, Mass.

I claim the combination, with the external boiler, a, of an internal boiler, b, provided with a perforated bottom, c, cover, d, and springs, i, and surrounded at the bottom and sides with a space, h, substantially as and for the purpose set forth.

82,818.—CONSTRUCTION OF POWDER KEGS.—Joseph B. Fleming and Daniel J. Fleming, Xenia, Ohio.

We claim, 1st, The process of making sheet-metal kegs, cans, etc., as above described, the essential feature of which process consists in leaving a large opening, E E, in the head that is last attached, through which opening a mandrel is inserted, upon which to form the joint around the edges or chimes, after the removal of which the opening is closed up by means of a piece soldered over it.

2d, A keg or can, constructed as above set forth.

82,819.—MAGAZINE FIRE-ARM.—Valentine Fogerty, Roxbury, Mass.

I claim, 1st, In combination with the magazine, the rocking finger, i, for throwing the cartridge laterally from line with the magazine into line with the barrel, substantially as set forth.

2d, Throwing the finger, i, laterally forward by the rear movement of the guard lever against the arm, l, on the finger journal or rock shaft substantially as described.

3d, Throwing the finger back to its former position by the forward movement of the breech pin directly against it, substantially as described.

4th, Combining with the breech block a notch, l', for receiving the cartridge flange and for preventing undue movement of the cartridge moving forward at the side thereof, when the same, in its retrograde motion, releases one cartridge and takes the next in rotation, substantially as described.

5th The lever, q, with its tongue, v, and tip, w, constructed substantially as shown, and operating in conjunction with spring, t, to withdraw and expel the cartridge shell and to guide the cartridge into the barrel, substantially as set forth.

6th, The combination, with lever, q, having projections, y and e', thereon, of the studs or pins, a' and d', for tripping the lever in its forward and back movements, upwards and downwards, by positive action in both directions.

7th, Connecting the lever, q, with the breech block, e, by the link, r, by means of a pin, c 2, projecting into a groove, c 2, in the block, substantially as and for the purpose set forth.

8th, Combining with the magazine slide and the breech block the pin, f', and its notched spring, for arresting positively the feed of the cartridge, substantially as described.

82,820.—ROTARY ENGINE.—Charles G. Foote, Indianapolis, Ind. Antedated September 21, 1868.

I claim, 1st, The valve, C D E, constructed substantially as set forth.

2d, The combination of all the parts described in one device, constructed in the manner and for the purpose substantially as set forth.

82,821.—BUCKLE.—Merwin Fowler, Wolcottville, Conn.

I claim a buckle, consisting of the frame, A, the loop, B, and tongues, C C, the said loop and tongues being formed in one piece, and hinged to the frame, so as to be retained in their proper relative position, substantially as herein set forth.

82,822.—GRAIN DRILL.—C. O. Gardiner (assignor to J. H. Thomas and P. P. Mast,) Springfield, Ohio.

I claim, 1st, The cup, A, formed substantially as described, with the inwardly projecting flanges, e, on the inner face of its sides, as set forth.

2d, In combination with the cup, A, the cylinder, B, so constructed as to leave a space between its ribs, o, and the sides of the cup, to prevent the crushing of the grain, as described.

82,823.—BRANDING STAMP.—W. C. Garretson and Elwood Draper, assignors to W. C. Garretson, Oskaloosa, Iowa.

We claim the device herein described and set forth, consisting of the lamp, e, the stamp, a actuating lever, b, with suitable base, j, arranged substantially and to operate as described and set forth for the purposes specified.

82,824.—CURTAIN FIXTURE.—Amos F. Gerald, Kendall's Mills, Me., assignor to B. B. Belcher, Chicopee, Mass.

I claim the construction and arrangement of the cup shaped bracket, C, and the conical spiral spring, B, contained within it, and having the disk, A, rigidly attached to its smaller end, in combination with roll, R, and bracket, C', having projection, J, and tongue, D', all arranged, constructed, and operating as herein described and shown, substantially as described.

82,825.—SAW SET.—Wm. E. Goodenough, Newark, N. Y.

I claim, 1st, The combination of the guide bar, m, and adjustable frame, p, carrying the guide rollers, nn, with the stock, A, hammer, B, and adjustable guide roller, W, all arranged and operating substantially as shown and described

2d, The spring, c, having a projection, h, and notch, i, attached to the sector, D, in combination with the stud, a, on the trigger, and adjustable stud, e, for operating together, substantially as set forth.

82,826.—SLED.—D. W. Gould, Fostoria, Ohio.

I claim a cast iron bob sled, when each side, including runners, knees, and fender, is cast entire in one piece, as herein set forth and described.

82,827.—KEY FOR HYDRANT COCK.—Patrick H. Griffin, Albany, N. Y.

I claim, as an article of manufacture, the cast metal socket, C, constructed substantially as described and for the purpose set forth.

82,828.—MACHINE FOR GRINDING AND POLISHING SCHOOL SLATES.—Stinson Hagaman, Weissport, Pa.

I claim, 1st, In combination with one or more horizontally rotating rubbing wheels, an endless belt, with slate carriages mounted thereon, for the purpose of carrying the slates under the rubbing wheel or wheels, substantially as described.

2d, In combination with one or more rubber wheels, as described, and an endless belt, for the purpose of carrying the slates, as set forth, the slate carriages, H, with their friction wheels and springs, as described.

3d, In combination with the endless belt, and slate carriages mounted thereon, as described, the ledges or tracks, l, and shoulders, t, on the rails of the machine, for the purposes set forth.

4th, The combination of the driving shaft, G, the pulley wheels, E F and F', with the endless belt, E, for rotating the rubbing wheels, and the pinion, h, worm screw, J, and pulley wheels, C and C', for carrying the endless belt, D, all arranged and operating substantially as described.

82,829.—BED BOTTOM.—Henry J. Hale, Indianapolis, Ind.

I claim, the corner guide pieces, C, in combination with the friction rollers, D, hung in adjustable bearings, e, attached to the upper metallic frame, substantially as and for the purpose set forth.

82,830.—BREAST YOKE FOR DOUBLE HARNESS.—A. F. Hammel, St. Louis, Mo.

I claim, 1st, The collar, A, and yoke, B, jointed at b and b', when combined and arranged substantially as described.

2d, The swivel, C c, in combination with the breast yoke, as and for the purpose set forth.

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82,831.—AUTOMATIC GATE.—Elam Harter, Dowagiac, Mich.

I claim, 1st, The combination of the gate, truck wheels, inclined bars or rails, and vibrating platform, with the levers and chains, or equivalents of the latter, by means of which pressure upon the platform causes the gates to run asunder on the inclined rails, substantially as described.

2d, The mechanism, herein described, for locking and unlocking the gate, substantially as shown and described.

82,832.—GRAPPLING IRON.—William H. Hawley, Utica, N.Y.

I claim the combination of the pulley, A, with the grappel, constructed and operating substantially as described, and for the uses and purposes mentioned.

82,833.—ROTARY PUMP.—Charles H. Hersey, Boston, Mass.

I claim the pump, constructed as described, with semi-spherical shell or body, conical diaphragm, and flat surfaced head, when the inlet and outlet passages are located and arranged as and for the purpose set forth.

Also, in combination with the parts last above named, the construction shown at 5, for the purpose specified.

82,834.—PAPER RULING MACHINE.—W. O. Hickok, Harrisburg, Pa.

I claim, 1st, Suspending the pen beam of a paper ruling machine, by means of the ball joints, D and D', in combination with sliding standards, B and B', operating together, substantially as and for the purpose described.

2d, The ball joint, D', consisting of the socket, h4, and the perforated ball therein, in combination with the srem, a''', on the end of the pen beam, the said parts operating together substantially in the manner described.

3d, In combination with the pen beam, A, and sliding ball joint, D', the solid ball joint, D, consisting of the spherical cavity within the clamp, a' a'', on the end of the pen beam, A, and the solid ball, g4 on the end of the screw, g'', the said parts being constructed and arranged to operate substantially as and for the purpose described.

4th, In combination with a pen beam, A, suspended upon the ball joints, D and D', as described, the sliding standards, B and B', operated by means of their respective screws, c'' c''', substantially as and for the purpose described.

5th, In combination with the pen beam of a ruling machine, the stem, a''', constructed and applied substantially as and for the purpose described.

82,835.—HARROW TEETH.—P. V. Hixon, Tioga, Pa.

I claim the gib, A, provided with projections, a, in combination with the shank, B, provided with corresponding indentations in all of its four faces, and tightening key, D, all constructed and operated in the manner and for the purpose set forth.

82,836.—FASTENING HORSE COLLAR.—B. H. Hobart, and D. C. Lamoman, Troy, Pa.

We claim the hollow end piece, B, provided with a spring actuated catch concealed within the same, when secured to one side of the horse collar, S, and made to fit into a socket, A, secured to the other side, the whole constituting an improved fastening for the collar, substantially as herein set forth.

82,837.—TILE MACHINE.—Asa Hockett, and Albert C. Hockett, Plainfield, Ind.

We claim the arrangement of the frame or box, A, tub, B, sliding frame, H, follower, G, gravel screen, L, and die, M, all constructed as described, and operating substantially as and for the purposes herein set forth.

82,838.—STALL FOR HORSES.—Alfred Hosmer, Watertown, Mass.

I claim the animal stall, A, when constructed and arranged substantially as and for the purpose described.

Also, the gutter, B, provided, by means of its position or form, with an inclined groove, having one or more outlets, and applied to a double or single floor, for the purpose of draining the same, substantially as described.

82,839.—BRACE FOR CARRIAGE.—Joseph Howe, Mount Pleasant, Iowa.

I claim the ring, a, ball and socket joints, c and d, and plate, b, in combination with braces, C, attached to the body of a carriage, as described, and operating as and for the purposes set forth.

82,840.—WHIP HANDLE.—Liverus Hull, Charlestown, Mass.

I claim the improved whip handle or manufacture, as having one or more knit, woven, or braided bands, laid in one or more helices, about and cemented to a braided or wound covering of thread, previously laid or formed on the stock of the handle.

Also, the combination and arrangement of the "Turks' heads," or their equivalents, the body covering of thread, and the helical bands, laid on and cemented to such body covering as set forth.

82,841.—STEAM BOILER FURNACE.—Hosea H. Huntley, Quincy, Ill.

I claim a furnace, having grate bars, C, with apertures, D, passage, G, tubes, O and K, and chambers, B H L, and M, constructed, arranged, and operating substantially as specified.

82,842.—COMBINED MEASURE AND WEIGHER.—A. B. Hurd, Watkins, N. Y.

I claim, 1st, The combination of the hook, l, with receptacle, A, and hinged balance handle, b, in the manner and for the purpose specified.

2d, The combined arrangement of the receptacle, A, stiff arm, a, hinged handle, b, with balance, f, and the hook, l, the said receptacle answering the double purpose of weighing and measuring, and the balance being adjustable by nut, k, the whole as described, and operating in the manner and for the purpose specified.

82,843.—STEAM GENERATOR.—Chas. F. Jauriet, Aurora, assignor to himself and A. J. Ambler, Chicago, Ill.

I claim the construction of the inner lining, C, and outer jacket of the door way, B, riveted together on the outside of the fire box, whereby a single sheet of metal forms the lining of the water space around the door way, and another single sheet the frame for the door, as herein set forth.

82,844.—STEAM GLOBE VALVE.—N. Jenkins, Boston, Mass.

I claim the arrangement of the bearing surface, l, of the valve head and the elastic packing, t, held in an annular recess in the valve head, as described, with the valve seat, f', and the raised seat, f, in the manner as shown and specified.

82,845.—SAW SET.—Abijah Johnson, West Newton, Ind.

I claim, 1st, The reciprocating bar, B, furnished with the adjustable setting nibs, C C, and, in combination therewith, the adjustable guides, D and P, all arranged and operating substantially as set forth.

2d, Actuating the bar, B, by means of the disk, F, furnished with the cams, r and s, arranged and operating substantially as set forth.

3d, The feed mechanism, consisting of the lever, G, bent lever, H, catch, N, set screw, I, spiral springs, X and M, cam, J, and pins, t, all arranged and operating substantially as set forth.

82,846.—DITCHING AND BORING MACHINE.—I.B. Jones, Xenia, Ohio.

I claim, 1st, In combination with a ditching machine, the auger, H, constructed as described, in whole or in sections, with a cutting edge at the lower end, and the edge along its rod, turned up and sharpened, substantially as and for the purposes herein set forth.

2d, The combination of the cogged hub of the master wheel, E, feed wheel V, and miter wheel, W, for the purpose of communicating motion to the wheels, B B, substantially as herein set forth.

3d, In a combined boring and ditching machine, the shaft, Y, miter wheels, X X, pinion, b, and wheel, c, in combination with the lever, Z, and notched latch, a, substantially as herein set forth.

4th, The combination of the auger, H, sheath, T, and mold board, U, all constructed as described, and operating substantially as and for the purposes herein set forth.

5th, The screw rod, d, provided with a crank, e, at one end, and attached to the axle of the hind wheels, for the purpose of turning the machine to the right or left, substantially as herein set forth.

6th, The arrangement of the movable cross head, S, provided with a shaft and pinions, as described, and operating on rack bars and slides on each side of the auger, H, substantially as and for the purposes herein set forth.

82,847.—SASH FASTENER.—H. H. Kelley, Philadelphia, Pa.

I claim the arrangement of the elastic roller, C, and wedge, E, and operating substantially as herein represented and described.

82,848.—STOVE PIPE DAMPER.—J. C. Kennedy, Chicago, Ill.

I claim a cone, B, or its equivalent, applied to a stove pipe, substantially as described, and employed in conjunction with a register, in the manner and for the purpose set forth.

22,849.—SIGNAL FLAG FOR VESSELS.—J. F. H. King, Port Richmond, N. Y. Antedated September 25, 1868.

I claim the constructing and combining the two frame pieces, a b, and the check chain or cord, g, with the halyards, for displaying or folding a signal flag, the whole arranged and operating substantially in the manner and for the purposes described.

82,850.—FOUNTAIN PEN.—Geo. Kneip, New York city.

I claim, 1st, The ink cistern B, provided with a central tube, d, in its receiving end, and with a valve, f, at its discharging end, in combination with the pen holder, A, constructed and operating substantially as and for the purpose set forth.

2d, The opening, e, in the sides of the pen holder, in combination with the transparent ink cistern, B, substantially as and for the purpose described.

82,851.—BORING FAUCET.—Jotham R. Lawrence and Isaac G. Johnson, Cutler, Me.

We claim a faucet having boring tool, C, core chamber, B, clamp, E, thumb screw, G, lever, F, gate, H, pin, I, and cleats, o, constructed, combined, and operating substantially as specified.

82,852.—APPARATUS FOR ATTACHING HORSES TO VEHICLES.—Charles Leroy, Mexico, N. Y.

I claim, 1st, The clips, C C, constructed as described, and secured to the shafts of the vehicle as and for the purpose described.

2d, Draft bar, A, rods or traces, B B, spiral springs, D D, and clips, C C, all combined, arranged, and operating substantially as and for the purpose set forth.

82,853.—GRAIN DRILL.—M. F. Lowth and T. J. Howe, Owatonna, Minn.

We claim, 1st, The device, consisting essentially of the shaft, G, pinion, H, bearing, J, sleeve, L, and cylinder, M, having the grooves, m m, when constructed and operating together, as described, and in connection with a driving shaft, F, seed hopper, D, and a lever, K, for moving the shaft back and forth, substantially as described.

2d, The combination of the graduated plate, N, index lever, K, and clamp, o, for conning the lever at any point of the plate, when employed in connection with the apparatus above described, and for the purpose set forth.

82,854.—ELASTIC APRON FOR PAPER MACHINE.—A. B. Lovell, Pomfret, N. Y.

I claim the combination of a rubber or gutta percha apron with the couching press rolls of a paper machine, when the same is provided with a tension roller, in the manner and for the purpose set forth.

82,855.—HORSE RAKE.—Ellis Luther, West Troy, N. Y.

I claim, 1st, The screw or twisted bar, E, with the foot, D, substantially as described.

2d, The said bar, E, and foot, D, in combination with the transverse bar, L, and apperture, a, substantially as herein specified.

3d, The said bar, E, and foot, D, in combination with the tooth, t, of the rake, substantially as specified.

4th, The winclass, N, in combination with the chain, M, and the head, A, of the rake, substantially as herein shown and described.

5th, The wheel, I, in combination with the chain M, and windlass, N, substantially as specified herein.

6th, The ratchet and pawl, o, combined with the windlass, N, and chain, M, substantially as herein set forth.

7th, The cord, b, attached to the chain, M, substantially as and for the purposes herein specified and set forth.

82,856.—INDICATOR FOR STEAM BOILERS.—Andrew J. Maris (assignor to himself and Wm. H. Burnap), New York city.

I claim the expansion tube alarm and gage cock, arranged in substantially the manner set forth.

82,857.—MODE OF ATTACHING AND DETACHING SHAFTS AND POLES OF CARRIAGES.—Leslie Marmaduke, Arrow Rock, and Sidney T. Bruce, Marshall, Mo.

We claim, 1st, The coupling heads, D a2, and the coupling block, E, when arranged and operated substantially in the manner and for the purpose herein shown and described.

2d, The arrangement of the axle piece, A, tractionrods, a a1, rod, B, lever, C, and coupling heads, D a2 E, substantially in the manner shown and described.

82,858.—PLOW.—Daniel Mater, Bellmore, Ind.

I claim, 1st, The arrangement of the transversely adjustable coulter or cutter, F, with reference to the beam of the plow and shovel, C, substantially as shown and described.

2d, In combination with the beam and standards, the brace rods, H, clamps, I, and nuts, I', arranged substantially as and for the purpose set forth.

82,859.—PREVENTING INCRUSTATION IN STEAM BOILERS.—Hugh McQuade, Canyon City, Oregon.

I claim the application in steam boilers of an amalgamated surface to the parts liable to incrustation, the iron plated with copper being coated with quicksilver, and being a liquid, on the surface of the copper, expands, as herein set forth, using for that purpose the aforesaid metals, or any other substantially the same, which will produce the intended effect.

82,860.—MECHANICAL MOVEMENT.—Geo. R. Metten, Cleveland, Ohio.

I claim a balance wheel, B, constructed with a flanged hub, having a friction band, p, applied thereto, in combination with a treadle motion and vibrating pawls, c c, arranged to operate substantially as described.

82,861.—MACHINE FOR MAKING DRAIN TILES.—James W. Milroy and John Cook, Galveston, Ind.

We claim the combination and arrangement of the box, sliding block, B, shaft, C, cog wheel, b, ratchet plate, c, friction rollers, d d, and friction roller D, molds, E and F, knives, G G, and table, G', substantially in the manner and for the purposes as herein set forth.

82,862.—BROADCAST SEED SOWER.—W. H. Mitchell and J. F. Mitchell, Macomb, Ill.

We claim, 1st, The stirrers, c, operated by the compound crank, R, when arranged to operate substantially as described.

2d, The distributor, L, constructed and arranged to operate substantially as set forth.

3d, The two slides, h and f, arranged to be operated independently or jointly, as herein described.

82,863.—WINDOW SPRING.—Edward W. Munson and Wm. P. Thomas, Waterbury, Conn.

We claim the case, A, within which is arranged the bolt, C, and combined with the rod, D, constructed with a shoulder, a, and with a rose, F the whole constructed and arranged so as to operate in the manner, substantially as specified.

82,864.—HORSE RAKE.—Geo. D. Neal, Mt. Vernon, Ohio.

I claim, 1st, The arrangement of the trap doors on the described frame, in combination with any suitable holding devices, as and for the purpose set forth.

2d, The central standard, E, connected to the rake beam and sliding through the mortise of central beam and in combination with the outer standards and arms, substantially as shown and described.

3d, In combination with such standard, the spring detent, with its catch, all constructed and operating substantially as and for the purpose set forth.

82,865.—PORTABLE FOLDING FENCE.—A. M. Olds, New York city. Antedated Sept. 26, 1868.

I claim the herein described combination, consisting of a fence constructed in pivoted panels, and supported by clamping braces, substantially as described and for the purposes set forth.

82,866.—APPARATUS FOR TREATING MILK.—Joel A. Otis and Thomas Barber, Watertown, N. Y.

We claim the arrangement of the double walled furnace, A, with the boiler, B, and flues, C C, when the furnace is made a part or extension of the boiler, and the flues are convoluted or bent back and forth, as shown, all the said parts being constructed, combined, and arranged in the manner described.

82,867.—HORSE HAY FORK.—Oscar Paddock, Watertown, N. Y.

I claim the combination with the center or claw operating bar in a fork, such as described, or a vibratory locking lever arm, arranged to catch over and press upon the head or upper end of the center bar, when the latter is depressed and connected with a tripping cord, or other suitable means for effecting its disengagement from the said center bar, substantially in the manner herein shown and set forth.

82,868.—PRUNING HOOK.—Benj. M. Parks, St. Louis, assignor to himself, A. C. Robinson, and Wm. Seymour, Louisiana, Mo.

I claim the hand slide, D, when operating by the rods, d and c, the lever, C, rod, b, lever, B, the lower knife, a', against the pressure of the spring, E, and arranged in combination with the rod, A, and the hook knife, a, substantially as herein set forth.

82,869.—ICE PRESERVER.—Julia W. D. Patten, New York city.

I claim an ice pitcher, consisting of a box or coves, having an outside wall of paper or pasteboard, lined with mica on the inside, substantially as described.

82,870.—STEAM ENGINE VALVE.—Benjamin F. Perkins, Holyoke, Mass.

I claim the combination and arrangement of the lock nut, D, with the stand, A, and packing nut, C, of a globe or angle valve, substantially as herein described.

82,871.—MODE OF PRESERVING MEAT.—Dr. M. Perl, Houston, Texas.

I claim covering meat with a flexible material, when said covering is saturated with a compound prepared substantially as herein set forth.

82,872.—HARVESTER RAKE.—D. J. Powers, Madison, Wis. Antedated September 28, 1868.

I claim, 1st, The combination of a hinged, pivoted, or yielding platform, located in the rear of the cutter bar, with a gaveler or rake, operating substantially in the manner for the purpose described.

2d, The combination of lever, a, cam, p, and sweep lever, g, operating substantially as specified.

3d, The combination of the lever, a, yielding platform, B, and spring, c, so arranged that the driver, while in his seat, may adjust the spring and regulate the size of the gaveler, substantially in the manner and for the purpose set forth.

4th, The combination of gaveler, D, with swinging apron, G, when said apron and gaveler are arranged to be operated by means of cord, y, and sweep lever, g, all being arranged and operated in the manner and for the purpose set forth.

82,873.—MEDICAL COMPOUND.—John Ramsburgh, Sr., New Madrid, Mo.

I claim the improved medicine, prepared of the materials and substances as set forth.

82,874.—STEAM ENGINE GOVERNOR.—John H. Randall and Charles E. Randall, Boston, Mass.

We claim, 1st, The combination of the double acting force pump, with the pipe, b'', cylinder, i, and with the throttle valve, m, and waste pipe, n, as herein specified.

2d, The arrangement of the cock, p, with the waste pipe, h, cylinder, i, pipe, h'', and nozible acting force pump, substantially as herein set forth.

82,875.—CORN PLANTER.—Simon B. Reeder, Meacham, Ill.

I claim a corn planter, when the same is provided with a roller, C, having in it two or more dropping boxes, a, with springs, b, attached, which springs are operated upon by a cam catch, c, substantially as described and for the purpose specified.

82,876.—MACHINE FOR WORKING IRON.—Jacob Reese, Pittsburg Pa. Antedated October 2, 1868.

I claim, 1st, The combination of a pair of reciprocating and compressing die blocks (or jaws) with one or a pair of non reciprocating compressing die blocks (or check plates), acting perpendicularly thereto and alternately therewith, substantially as described.

2d, An arrangement of mechanism for imparting to one or both of a pair of compressing die blocks a reciprocating movement simultaneously or alternately with a movement of approach toward or recession from each other, substantially as described.

3d, In combination with one or more compressing die blocks, a pair of reciprocating and compressing die blocks, the coacting faces of which are, in their normal condition, more widely separated from one another at the point where the metal is introduced between them than at the point where the metal is extruded from them, substantially as described.

4th, In combination with one or more compressing die blocks, a pair of reciprocating compressing die blocks, the coacting surfaces of which, one or both, are curved substantially as described, for the purpose, in part, of permitting, and aiding to produce, a more or less retrograde or backward movement of the metal while the same is being acted on alternately with the general forward movement of the same, substantially as hereinbefore set forth.

5th, In combination with a pair of reciprocating and compressing die blocks, operating substantially in the manner described, an inclined feeding trough, for guiding and facilitating the forward movement of the bloom or paddle ball to and between said die blocks, substantially as herein described.

6th, As a whole the improved machine, consisting of the several parts, constructed and combined, substantially as and for the purpose described.

82,877.—PROCESS OF ELECTRO PLATING WITH NICKEL.—Wm. H. Remington (assignor to himself, Sarah A. T. Peabody, and George D. Allen), Boston, Mass.

I claim suspending or supporting or holding a mass of the particles of nickel within the solution so as to present an extended surface, and connecting them with the positive pole of the battery by means of platinum or other suitable conductor of electricity, not materially affected by the electric current or the solution employed, substantially as described.

Also, a positive electrode, composed of a plate of metal, carbon, or other conductor of electricity, upon which a coat of nickel of sufficient thickness shall have been deposited, substantially as set forth.

Also, the within described solution, prepared of the ingredients and in a manner substantially as described.

Also, a substance coated or plated with nickel, as herein set forth, as a new article of manufacture.

82,878.—LUBRICATOR.—David M. Reynolds, Port Deposit, Md.

I claim the employment, in combination with the oil vessel, having arranged in the bottom thereof an internal chamber or receptacle, so that the sediment or other impurities of the oil shall collect around said chamber, of a fibrous or other suitable filtering substance, together with a disk, whether perforated or not, but provided with a regulating screw, the whole being so arranged within said internal chamber that the filtering medium may be more or less compressed, thereby regulating both the supply of the oil and the density of the filtering medium, substantially as herein set forth.

82,879.—COLLAR FASTENING.—Charles H. L. Roberts and William C. Dudley, Morrison, Ill.

We claim the arrangement of the adjustable straps, D D, looped wires, j j and l l, with the collar A, provided with the pad, B, loop, g, and slotted housing, C, all constructed and used as and for the purposes set forth.

82,880.—BEEHIVE.—Geo. C. Schneider, Adrian, Mich.

I claim a bee hive constructed of three or more similar interchangeable sections, D D' and D'', etc., in combination with the hollow cap, A, feed box B, opening, S, and small movable lid, h, the whole constructed and operating in the manner and for the purposes set forth and described.

82,881.—RAILROAD RAIL.—E. R. Shepard, Scranton, Pa.

I claim, 1st, A rail consisting of two sections, A B, the former having an inclined bearing below the head, adapted to the inclined edge of a rib on the lower section, and the latter having at the base an inclined bearing for the rib on the upper section, substantially as and for the purpose described.

2d, The lower section, B, with its rib, d, the upper section, A, with its slotted rib, b, inclined at the outer side, and the bolt, D, with its head bearing against the inclined side of the rib, b, the whole being constructed and arranged substantially as and for the purpose specified.

82,882.—MACHINE FOR POLISHING PAPER.—Samuel Shepherd and Ammi M. George (assignors to Samuel Shepherd and Joseph Greeley), Nashua, N. H.

We claim, 1st, The combination with any number of burnishing rolls, B operating substantially as described, of a revolving annular bed, C, supported at or near its periphery, and of open character or construction at its center, or within its interior periphery, for operation relatively to each other essentially as and for the purpose or purposes herein set forth.

2d, The combination with a circular traveling bed, C, of a reducing emery or other equivalent roll, D, having a rotary and longitudinal reciprocating action on or against and in contact with said bed, substantially as and for the purpose specified.

82,883.—BURNISHER FOR ENAMELED PAPER.—Samuel Shepherd and Ammi M. George (assignors to Samuel Shepherd and Joseph Greeley), Nashua, N. H.

We claim a polishing surface or device made of stoneware, substantially as specified.

82,884.—FRUIT JAR COVER.—John Siddons, Rochester, N.Y. Antedated Sept. 26, 1868.

I claim providing fruit jar covers, consisting of two metal disks, a b, with a corrugation, e, or its equivalent, for the purposes herein set forth.

82,885.—RAILROAD CAR HEATING APPARATUS.—Thos. Smith and John O. Reilley, Baltimore, Md.

We claim, 1st, The compressed air reservoirs and radiators, H, located in the passenger cars, in combination with a heating apparatus located outside of said cars, substantially as set forth.

2d, The combination of the air pump, A, compressed air receiver, B, and furnace, C, substantially as described.

3d, The combination of the pipe coupling, F, and conducting knuckle joint G, as and for the purpose set forth.

4th, The combination of the elastic conducting pipes, D E E', air forcing and heating apparatus, A B C, and reservoir, H, substantially as described.

5th, The construction and arrangement of the valve mechanism, I J K, in combination with the pipes, E', and reservoirs, H, for the purposes explained.

6th, The air conducting and discharging pipes, M N, in combination with the reservoirs, H, and cocks or valves, L, as and for the object specified.

82,886.—APPARATUS FOR CUTTING METALLIC BARS.—Theodore Snell and William Tucker, Philadelphia, Pa.

We claim, 1st, Locating the two cutting dies in their respective die stocks, so that a bar placed within them to be cut shall extend in the direction and occupy the position of the axis of rotation of one or both of said cutting dies, substantially in the manner described.

2d, In a rotary shears constructed as specified in the preceding clause, the dies, K L, made each in two parts, and pressed together by screws, C'', for the purpose of clamping the metal bars between them, as explained.

3d, The differential screw, H H', in combination with the levers, B' E, die stocks, B and C, and supporting frame, A substantially as described.

4th, The pawl, J, and toothed segment lever, D d, in combination with the arm, E, and the stock, C, for the purpose stated.

82,887.—CANAL BOATS AND OTHER VESSELS FOR THE TRANSPORTATION OF GRAIN.—Daniel E. Somes, Washington, D. C.

I claim, 1st, A canal boat or other vessel or vehicle having a perforated lining or casing, with spaces for the circulation of air between it and the walls of the vessel or vehicle, substantially as and for the purpose set forth.

2d, A canal boat or other vessel or vehicle with a perforated false floor, with an air space between it and the bottom of the vessel or vehicle, substantially as set forth.

3d, Heating apparatus in combination with ventilating tubes, G, perforated tubes, E, and hoods, f, substantially as set forth.

4th, Perforated lining, B, ventilating tubes, G, hoods, f, openings, c, guards c1 c2, substantially as described.

5th, A canal boat or other vessel or vehicle having a perforated casing or lining, inclosing air flues and a heating apparatus, substantially as and for the purpose set forth.

6th, The perforated lining, B, perforated tubes, E, and air ducts, F, or their equivalents, substantially as described.

7th, The perforated lining, with inclined partitions, forming flues between it and the walls or bottom of the vessel, or both, substantially as described.

8th, The heating apparatus, in combination with the perforated lining and ventilating tubes, G, as set forth.

9th, The air tube, E, in combination with the ventilating tubes, G, as set forth.

82,888.—OIL CUP.—Henry Stanley (assignor to G. & W. Todd & Co.), St. Louis, Mo.

I claim the combination of the oil cup, A, stopper, a', wooden end piece, B, slotted at b2, and capped by the metallic cap, C, having the minute perforation, c, substantially as hereinbefore set forth.

82,889.—MACHINERY FOR PRINTING YARN.—Edward J. Stephens, North Providence, R. I.

I claim the contrivance and arrangement of the color carriers, F F, as shown in the drawings, and their combination with the color rollers, E E, and the fluted or ribbed rollers, A A, so as to put different colors upon different flutes or ribs of the rollers, A A, and thus to print the yarn with different colors, with distinct intervals or spaces between.

82,890.—HARVESTER.—Lyman B. Stilson, Woodland, assignor to himself and August Leich, St. Anthony, Minn.

I claim the arrangement, in a front draft machine, of the finger bar, A, and bars, B B, the latter hinged to the axle of the machine, and connected with the bar, A, as shown and described, and constructed substantially as set forth.

82,891.—MODE OF PREPARING PLASTER CASTS.—Thomas Taylor, Washington, D. C.

I claim, 1st, The use of silicate of soda or other soluble silicate, with or without glycerin, as a varnish, for the purposes as substantially set forth and described herein.

2d, The use of alkalies, or their equivalents, when used as solvents of silicates, when used substantially as in the manner herein set forth and described.

82,892.—CHURN-DASHER.—Morgan H. Thomas, Dansville, N. Y.

I claim the cone shaped top, A, perforated with holes, a a, as described, and dasher rod, B, in combination with the cross bars, C C, when the latter are hinged to the lower part of the top, A, on one side, and fastened to the opposite side of said top A, by a clasp, all arranged, constructed, and operated in the manner and for the purpose set forth.

82,893.—STEAM GENERATOR.—C. F. Trill, Baltimore, Md.

I claim, 1st, The combination of the boiler, A, with the layer or layers of wire, a a, wound around it, as described.

2d, The arrangement, within the steam generator, A, of the chambers, E F G, with the pipes, D J K, and burners, I, substantially as described.

82,894.—TEA TRAY.—S. N. Trump, Baltimore, Md.

I claim, as a new article of manufacture, a tea tray, composed of the wooden body, A, metallic rail, B, standards, C C, and feet, D D, substantially as described.

82,895.—BOXING, BANDAGING, AND PREPARING CHEESE.—Albert M. Utley, H. N. Kimball, and William Reynolds, Watertown, N.Y

We claim, 1st, The use, in connection with covers for the top and bottom of the cheese, of a paper bandage, encircling and permanently united, during the process of curing, with the sides of the cheese, substantially in the manner and for the purposes set forth.

2d, The combination, with the paper bandage for encircling and holding the sides of the cheese, of top and bottom flaps of cotton, or other suitable fabric, applied and used in the manner specified.

82,896.—GRAIN HARVESTER.—Medders Vanderpool, Polk county, Oregon.

I claim, 1st, The arrangement of the spiral screw, A, with the right head board of the concave, 20, whereby the standing grain is conducted to said head board without being pulled from the ground, as herein shown and described.

2d, The combination of the obliquely ribbed drums, O, ribbed concaves, 20, and spiked drums, 22, substantially as described, for the purpose specified.

3d, So constructing and arranging the rod, D D, provided with tapering spurs, that the standing straw is forced to the rear, to deposit the threshed grain upon the bed, X, before said straw is drawn out of the machine, substantially as herein shown and described.

4th, The combination of the ribbed drums, O O, spurred wheels, 22, ribbed concaves, 20, and troughs, 40, substantially as described, for the purpose specified.

82,897.—COOKING STOVE.—Nicholas S. Vedder, Troy, N. Y.

I claim, 1st, The piece, F, when constructed as and for the purposes herein described.

2d, The plate, C, forming the air chamber, E, when made sliding, as herein shown and described.

82,898.—SMUT MILL.—J. C. Waggoner, St. Louis, Mo.

I claim, 1st, The feed shoe, F, arranged with two short inclined floors, f, upon which the falling grain shall strike and from which it shall be precipitated in a "shower" upon the pocket, G, and in combination with the superposed blast tube, G, substantially as set forth.

2d, The discharging wings, H, in combination with the curved beaters, C, acting substantially as set forth.

3d, The blast tubes, G and K, and their ducts, G2 K2, the regulating slides, L and L', and the fan, E, all acting substantially as and for the purpose set forth.

82,899.—RAILWAY CAR SEAT.—F. F. Wagner, Harrisburg, Pa.

I claim, 1st, The curved body frame, K K', connected to the arc rails, x, of the support, by means of the clips, P, and with the sliding seat, by means of the clips, P, and with the sliding seat, by means of the cams, S, pins, n, and the fulcrum rods, B O n, all constructed and arranged substantially as and for the purpose specified.

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2d, The slotted connecting rods, N A, in combination with the fulcrum rods, B O n, when arranged on the sides of the sliding frame, N, K K', to effect reversion in the manner as herein expressed.

82,900.—Spike.—R. K. Walton, Clarington, Ohio.

I claim a spike, formed with an opening, o, through it, and a guide groove, leading from its upper end to the opening, substantially as above set forth.

82,901.—Brace and Skirt Supporter Combined.—Mrs. Ruth Ann N. Atwood Ward, Philadelphia, Pa.

I claim the improved brace and supporter, consisting of pieces, a, straps of belting, b d e f, and l, and buckle straps, i and m, and elastic straps, g h k, when arranged to operate for bracing and supporting, substantially as described.

82,902.—Metallic Roofing.—Wm. Ward, Cleveland, Ohio.

I claim the metal roofing, composed of sheets of metal cut and bent, as shown in figs. 3 and 4, having flanges or lips turned thereon, as described, and used with strips, D, to form the roof, all constructed and arranged in the manner and for the purpose as described.

82,903.—Window Strip Attachment.—Winthrop Ward, Mystic Bridge, Conn.

I claim the provision, on a window strip, of spring pins, adapted to slip into tubular sockets in the window frame for the purpose of attaching said strip, substantially as described and represented.

82,904.—Felted Fabric.—J. T. Waring, Yonkers, N. Y. Antedated September 28, 1868.

I claim the new manufacture of a tufted fabric, having tufts of wool or other fibrous materials and a felt body wholly of wool or other suitable felting material, or of mixed felting and non-felting materials, the body and tufts being made into a fabric by the process of felting in the manufacture of the fabric, substantially as hereinbefore described.

Also, the perforated tuft holders or their equivalent, in combination with the jiggger board and steam box, substantially as herein described.

82,905.—Tank for Fermenting Ale, Beer, etc.—E. K. Warren, Rochester, N. Y.

I claim, 1st, The employment of the conical or inclined top, C, in combination with pontoon, A, and the conical top, B, of the two coils, E E', of water pipe, the water passing first into, E, and then upward into, E', the whole as described and for the purpose specified.

2d, The combination and arrangement, with the pontoon, A, and conical top, B, of the two coils, E E', of water pipe, the water passing first into E, and then upward into E', the whole as described and for the purpose specified.

82,906.—Trace Fastener.—Fayette M Weller, Chicago, Ill. Antedated September 24, 1868.

I claim the curved hook, A', to be placed on the whiffle tree, in the manner as represented by figs. 1, 2, 3, and 4, the improvement which I desire to secure by Letters Patent; hence,

Also, the curved hook, A', constructed and arranged substantially as and for the purposes herein set forth and described.

82,907.—Machine for Converting Rotary into Reciprocating Motion.—Christopher C. Welsh, Pleasant Valley, Pa.

I claim, in combination with the single set of gearing, the arrangement of the swinging lever, V, vertical connecting rod, U, rocking lever, R S, vertical arm, T, and crank, O, when constructed and operating substantially as herein represented and described.

82,908.—Breech Loading Pistol.—D Werner, St. Louis, Mo.

I claim the barrels, B, of the described pistol, provided with the catch, f, located as shown and described, and having the studs, c c, sliding upon the rod, d, and operated in connection with the spring, o, as described, when said barrels are combined with the stock and locks of an ordinary pistol, in the manner and for the purpose set forth.

82,909.—Extract of Barley Malt.—Minna Wesselhoeft, Baltimore, Md.

I claim a new article of manufacture for dietetic and remedial purposes, a concentrated extract of malt, prepared in the manner as described.

82,910.—Cooking Stove.—E. D. Weston, Taunton, Mass.

I claim the bottom plate of the air flue, as made of the five sections, c d e f g, having their joints arranged transversely and longitudinally of the top plate, and provided with overlapping flanges, h, as described, in order that the lateral and longitudinal expansion of the top plate may freely take place.

Also, when the series of partition plates of the air flue is extended partially across the space underneath the top plate, the combination of the end flanges, m m, with such plates, and the extension of the jambs and end plates of the stove body up against the said flanges, the partition and top plates, and these latter (with the partition and top plates) beyond the jambs and end plates or body of the stove, in manner as represented.

Also, the said end flanges, m m, as constructed with notches or openings, o o, for the exit of air from the air flue into the smoke flue over the oven.

82,911.—Clothes Line Adjuster.—Rudolph White, Newport, Pa.

I claim the arrangement of the spring, D, in combination with the swivel hook, A, and bearings, B B', in the manner and for the purpose set forth.

82,912.—Knife Ring.—J. C. Wilmarth and Avery Forbes, St. Louis, Mo.

We claim the combination and arrangement of the ring, A, having the stud, a, knife, a1, and shield, a2, as and for the purpose described and set forth.

REISSUES.

71,680.—Machinery for Making Tin Cans.—Dated December 3, 1867; reissue 3,143.—Christian Barry, Philadelphia, Pa.

1 claim, 1st, The mode of manufacturing cans, substantially as herein described.

2d, The roll, C, with beveled edge, f, and roll, B, with flange edge, g, operating together substantially as herein described for the purpose specified.

3d, The swage or die, J, having bevel periphery, q, and swage or die, K, having a correspondingly beveled periphery, r, operating together substantially as described for the purpose specified.

4th, The shoulder, s, on the swage or disk, K, forming a gage and support, substantially as herein described and represented.

22,228.—Seed Planter.—Dated December 7, 1858; reissue 3,144.—Jarvis Case, Lafayette, Ind., for himself and Newton Baldwin, administrator of Wm. Baldwin, deceased, assignees of Jarvis Case.

I claim, 1st, A corn planter, consisting of a front and rear frame, when said frames are connected by a central bar, said connecting bar being either an extension of the driver's seat or an independent bar, substantially as described.

2d, Pivoting the rear frame to the front one by means of the forward extension of the driver's seat, connected to the post, F, or its equivalent, substantially as described.

3d, The locking bar or catch, K, pivoted to the seat bar, c, and arranged to engage under the projection, j, or its equivalent, substantially as set forth.

4th, The reversible marker, consisting of the rigid bar, L, hinged to the front frame in such a manner that its outer end shall rest upon the ground without being raised therefrom or resting on the runner while the machine is in operation, and still be raised clear from the ground when the front part of the machine is elevated, substantially as described.

5th, A runner for corn planters, having the hollow or recess in its upper edge for the marker a seed duct, formed by cutting a channel in the side of the runner, and covering it with a plate, and also having the straight edge of the runner so inclined that its heel shall be the lowest point, substantially as and for the purposes set forth.

6th, The combination of the rock shaft, N, with the treadle or foot lever, f, applied thereto, with the seed slide, h, arranged to operate substantially as described, for the purpose of enabling the driver to operate the seed slides with his feet, as set forth.

63,051.—Refining Petroleum.—Dated March 19, 1867; antedated September 19, 1866; reissue 3,145.—Fleury Huot, New York city, assignee, by mesne assignments, of himself.

I claim, 1st, The process, herein set forth, of purifying petroleum and other liquids by mixing with the same bone black or other carbonaceous material, and then separating the said liquid from the carbonaceous substances by a centrifugal filter, substantially as and for the purposes set forth.

3d, The centrifugal filter, formed of two thicknesses of cloth, with an intervening layer of filtering paper, as and for the purposes set forth.

63,400.—Hydro-Carbon Burner.—Dated April 2, 1867; reissue 3,146.—Joel Lee, Galesburg, Ill.

I claim, 1st, Packing the conducting tube with wood, in the manner and for the purpose set forth.

2d, A gas generator, made of a coiled tube, and so arranged that the gas or vapor passes through its centre, substantially as set forth.

50,606.—Machine for Grinding and Polishing Saws.—Dated October 24, 1865; reissue 3,147.—John Lippincott, Thos. Bakewell, Benjamin P. Bakewell, and Benjamin Bakewell, Jr., Pittsburgh, Pa., assignees of Wm. J Lippincott.

We claim a machine for grinding and polishing long saws, consisting of a grindstone supported on adjustable bearings, so as to be raised or lowered at pleasure in the manner described, and having a cylindrical support for the saw plate to rest upon as it if being ground, the axis of which is in the same vertical plane as that of the grindstone, and with one or more pairs of feed rollers having pressure screws, or their equivalent, so as to hold and guide the saw in its passage under the stone, such feed rollers being geared so as to have a positive and continuous motion on their axes in such direction as to feed the saw plate forward either with or against the motion of the revolving grindstone, substantially in the manner and for the purposes hereinbefore set forth.

44,019.—Corn Planter.—Dated August 30, 1864; reissue 3,148.—James Selby, Peoria, Ill.

I claim, 1st, The main frame, mounted on two wheels, and having the runners pivoted at their front end to the front part of the main frame, substantially as described.

2d, The levers H, connected to the hoppers or runners by the links, h, and arranged to operate as described.

3d, The hoppers, F', connected by one or more cross bars located above the main frame, B, so as to permit the hoppers and runners of the machine to be raised or lowered without elevating the front part of the main frame, substantially as described.

4th, The semi-circular cut-offs, t, constructed and arranged to operate substantially as described.

5th, The adjustable plates, I, arranged to support and regulate the position of the runners, substantially as set forth.

6th, The combination of the pivoted scrapers, O, and the adjustable plates, O', when arranged to operate as described.

79,277.—Lamp Chimney.—Dated June 23, 1868; reissue 3,149.—Michael Sweeney, Wheeling, W. Va., assignor to Sweeney, Bell & Co.

I claim, as an article of manufacture, a lamp chimney, constructed with the lens or lenses, B, one or more, in its surface, substantially shown and described.

79,050.—Convertible Lounge.—Dated June 23, 1868; reissue 3,150.—Lewis H. Baker, Tarrytown, N. Y.

I claim, 1st, The combination, with a bedstead lounge, of an extension or folding washstand, constructed and arranged substantially as shown and described.

2d, The forming of a receptacle, l, in the part, A, of the lounge with an opening, k, in the seat portion, a, for the purpose of stowing pillows when the device is not in use as a bedstead, substantially as shown and described.

3d, The hinged part, D, depressed, and the seat part, A, having its seat, a, raised, whereby a space is left between said parts for the reception of bed clothing, as heretofore shown and described.

82,202.—Manufacture of Artificial Stone.—Dated September 15, 1868; antedated September 7, 1868; reissue 3,151.—William K. Boyle, Bladensburg, Md.

I claim, 1st, The herein described improvement in artificial stone, by which an insoluble silicate of lime is formed by the double decomposition of the silicates of potassa or soda and nitrate of lime, substantially as herein set forth.

2d, The herein described method of forming artificial stone, by the use of an alkaline silicate and nitrate of lime, when the latter salt is recovered, and the washings treated in the manner described, so as to utilize the acid element or recover the nitrates for the market.

3d, The utilization of all the salts left in the residual liquors, as herein described, whereby a continuous formation of nitrate of potassa or soda is kept up.

45,910.—Oscillating Valve.—Dated January 17, 1865; reissue 3,152.—Guy Davis, Syracuse, N. Y.

I claim, 1st, An oscillating valve suspended upon adjustable bearings, substantially as shown and described.

2d, The steam chamber, D, constructed substantially as shown and described.

3d, The arrangement of the steam passages, J E K and G, substantially as shown and described.

4th, The arrangement of the exhaust apparatus, T, with reference to the aperatures, G G', substantially as shown and described.

77,064.—Centrifugal Machine for Draining Sugar, etc. Dated April 21, 1868; reissue 3,153.—Hugh W. Lafferty and Robt. Lafferty, Gloucester, N. J.

We claim, 1st, In combination with the swinging revolving shaft, S, of a centrifugal draining machine, an elastic stay applied to said shaft, at a point intermediate between its flexible joint or bearings and its attached cylinder, substantially as herein set forth.

2d, The combination of a fixed hollow shaft, H S, with the suspending and driving shaft, S, of a centrifugal machine, to afford stay or support thereto, substantially as herein set forth.

3d, The combination of an extended elastic ring or band, D, D', with the outer upper end of a fixed auxiliary stay shaft, H S, combined with the revolving shaft, S, of a centrifugal machine, to form a seat and stay for the same, substantially as herein specified.

4th, The combination of the conical divided washer, C' O', encircling the shaft, S, with a conical seat, C O, in the end of and enclosing shaft H S, and with a hollow nut, H N, working against said washer, substantially as herein set forth.

5th, A friction brake, B', operating against the lower end of the driving suspending shaft, S, of a centrifugal machine, substantially as herein set forth.

6th, The combination of the lower extended extremity of the driving and suspending shaft, S, of a centrifugal machine with the bottom of the casing thereof, substantially as herein set forth.

7th, The combination of a waste cup, c', with the shaft or spindle, S, of a centrifugal machine, to prevent the passage of oil down into the basket or cylinder thereof, substantially as herein set forth.

15,775.—Lubricator.—Dated September 23, 1856; reissue 3,154.—Edward Miller, Meriden, Conn., assignee of Norman W. Pomeroy.

I claim a lubricator, the disk of which, forming the bottom thereof, is constructed so that the central part may be readily pressed inward, and returned to its original position when relieved from pressure, the said bottom being so attached to the cup as to be protected by the edge of the cup, substantially in the manner herein set forth.

70,614.—Harvester.—Dated Nov. 5, 1867; reissue 3,155.—Amos Rank, Salem, Ohio.

I claim, 1st, The combination, substantially as set forth, of a vibrating platform, with a scraper hinged to the outer divider, which removes the discharged gravel out of the way of the team in cutting the succeeding swath.

2d, The combining of a vibrating platform, composed of slats supported at one end only, with a scraper hinged to the outer divider, which clears the track for the next round.

3d, The combination of a vibrating platform, connected with the main frame, through the medium of the finger beam only, with a scraper hinged to the outer divider, which removes the discharged gravel out of the way of the team in cutting the succeeding swath.

4th, The combination of a finger beam with a flexible track clearer or scraper, having its forward end hinged to the finger beam, and its rear end suspended by a flexible connection from the main frame.

53,693.—Syrup Filter.—Dated April 3, 1866; reissue 3,156.—Marvin Washburn & Co. Alton, Ill., assignees of James L. Smith.

We claim the filter herein described, composed of raw wool, F, suspended between the funnel or other shaped sieve, D, and sieve, B, in the skeleton hemispherical frame, H C, within a suitable case, A, for sirup, oil, liquors, and fluids, all substantially as specified.

81,237.—Composition for Tanning.—Dated Aug. 18, 1868; reissue 3,157.—Ira Wood, Woodstock, Vt.

I claim, 1st, A tanning liquid made of the leaves of the different varieties of the oak, or maple, or willow, or beech trees, used separately, or combined with each other, or two, or more, or all, in equal or in any proportions, for the purpose and in the manner above set forth.

2d, A tanning liquid made of the leaves of the different varieties of the oak, or mable, or willow, or beech trees, used separately, or two, or more, or all of them together, in combination with alum, Glauber's salts, and nitric acid, in about the proportions specified, and for the purpose and in the manner above set forth.

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2,743.—Compass.—D. B. Strouse, Salem, Va. Sept. 5, 1868.

2,747.—Frog Plate.—Joseph Wood, Red Bank, N. J. Sept. 7, 1868,

2,755.—Knitting and Knitting Machinery.—M. L. Roberts, New Brunswick, N. J., and Fergus Penilston, New York city. Sept. 7, 1868.

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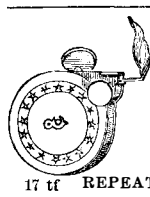

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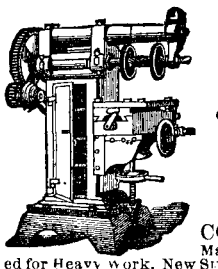

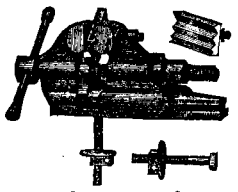

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Marshall Burnett and Charles Vandervoerd, Boston, Mass., having petitioned for an extension of a patent granted them on the 2d day of January, 1855, for an improvement in "Grain and Grass Harvesters," it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
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U. S. PATENT OFFICE,
Washington, D. C., Oct. 3, 1868.
Lysander Wright, of Newark, N. J., having petitioned for the extension of a patent granted him on the 2d day of January, 1855, for an improvement in "Sawing Machine," it is ordered that said petition be heard at this office on the 14th day of December next.

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Ambrose Foster, of Lauraville, Md., for himself and the representatives of J. A. Messenger, deceased, having petitioned for an extension of the patent granted the said Ambrose Foster, on the 16th day of January, 1855, for an improvement in "Building Blocks," it is ordered that the said petition be heard at this office on the 21st day December next.

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Martin P. M. Cassity, of Granada, Kansas, administrator of the estate of Isaac H. Steer, deceased, having petitioned for an extension of the patent granted to Henry Carter, assignee of said Steer, the 19th day of June, 1855, antedated the 19th day of December, 1854, for an improvement in "Making Nuts," it is ordered that said petition be heard at this office on the 12th day of December next.

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U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 24, 1868.
P. W. Mackenzie, of Orangeville, N. Y., having petitioned for an extension of the patent granted him on the 2d day of January, 1855, for an improvement in "Machine for Blowing Blasts" etc., it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
16 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 26, 1868.
Allen B. Wilson, of Waterbury, Conn., having petitioned for an extension of the patent granted to him on the 19th day of December, 1854, for an improvement in "Sewing Machines," it is ordered that said petition be heard at this office on the 7th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
16 3 S. H. HODGES Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept 25th, 1868.
Jesse W. Hatch and Henry Churchill, of Rochester, N. Y., having petitioned for an extension of the patent granted to them on the 2d day of January, 1855, and reissued on the 24th day of July, 1866, for an improvement in "Machines for Cutting Boot and Shoe Soles," it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing
16 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 30, 1868.
Arnton Smith, of Girard, Ill., having petitioned for an extension of the patent granted him on the 16th day of Jan., 1855, for an improvement in "Plows," it is ordered that said petition be heard at this office on the 21st day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed at this office twenty days before the day of hearing.
16 3 S. H. HODGES, Acting Commissioner of Patents

U. S. PATENT OFFICE.
WASHINGTON, D. C., Sept. 21, 1868.
Hannah M. Brown, of Woonsocket, R. I., administratrix of the estate of John E Brown, deceased, and W. E. Barrett, of Providence, R. I., executor of the estate of Stephen S. Bartlett, deceased, having petitioned for the extension of a patent granted to the said John E. Brown and Stephen S. Bartlett, on the 2d day of Jan., 1855; reissued Jan. 1st, 1861, and again reissued Feb. 25, 1862, in three divisions, numbered respectively 1281, 1282, and 1283, for an improvement in "Grain and Grass Harvesters," it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
16 3 S. H HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 18, 1868.
Thomas Slaight, of Newark, N. J., having petitioned for an extension of the patent granted him on the 2d day of January, 1868, for an improvement in "Padlocks," it is ordered that the said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
15 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 9, 1868.
Sylvanus Sawyer, of Fitchburg, Mass., having petitioned for an extension of the patent granted to him on the 24th day of June, 1851, for an improvement in "Machinery for Cutting Rattan," etc., (this application having been authorized by act of Congress, March 2, 1867), it is ordered that the said petition be heard at this office on the 24thday of December next.

Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
15 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE.
Washington, D. C., Sept. 21, 1868.
Joseph S. Winsor, of Providence, R. I., having petitioned for the extension of the patent granted him on the 2d day of January, 1855, for an improvement in "Machines for making Weavers' Harness," it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
15 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE.
Washington, D. C., Sept. 23, 1868.
Sylvanus Sawyer, of Fitchburg, Mass., having petitioned for the extension of a patent granted him the 2d day of January, 1855, for an improvement in "Machine for Splitting Rattans into Strips," it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
15 3 S. H. HODGES, Acting Commissioner of Patents.

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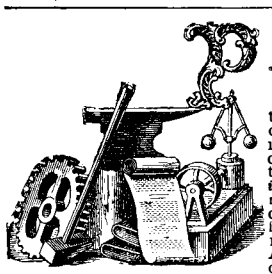

PATENTS

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The model should be neatly made of any suitable materials, strongly fastened, without glue, and neatly painted. The name of the inventor should be engraved or painted upon it. When the invention consists of an improvement upon some other machine, a full working model of the whole machine will not be necessary. But the model must be sufficiently perfect to show, with clearness, the nature and operation of the improvement.

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When the invention consists of a medicine or compound, or a new article of manufacture, or a new composition, samples of the article must be furnished, neatly put up. Also, send us a full statement of the ingredients, proportions mode of preparation, uses, and merits.

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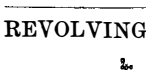

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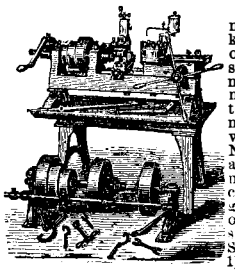

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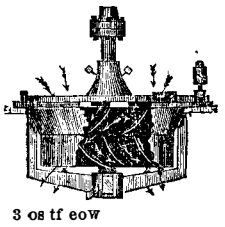

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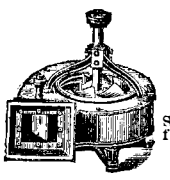

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